THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXV. No. 1932.] LONDON, MAY 22, 1900. [52ND YEAR. PRICE 6d.

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SEVERAL DESIGNS SHOWN BELOW.

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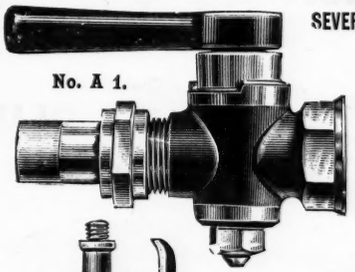
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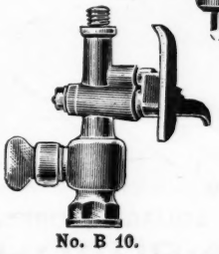
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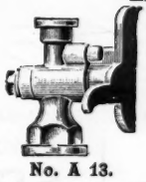
No. A 13.

No. A 12.

No. A 1.

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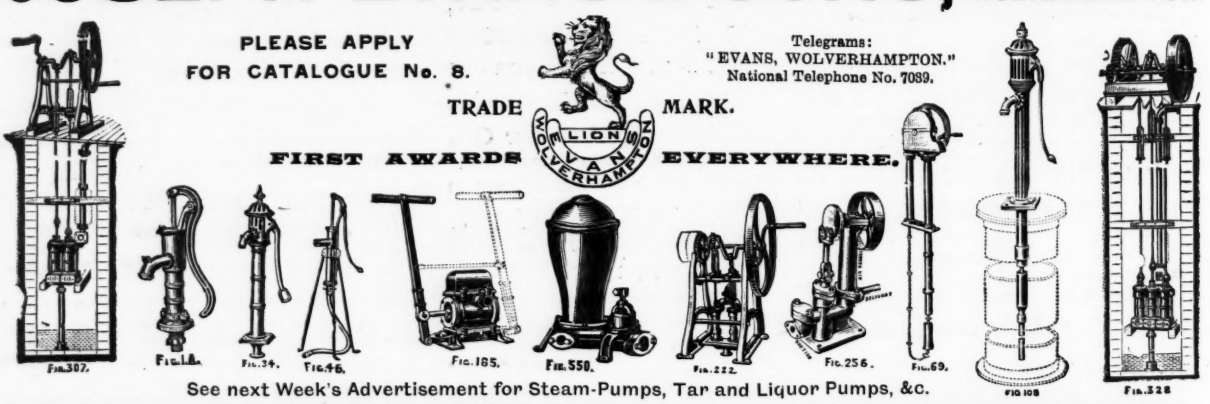

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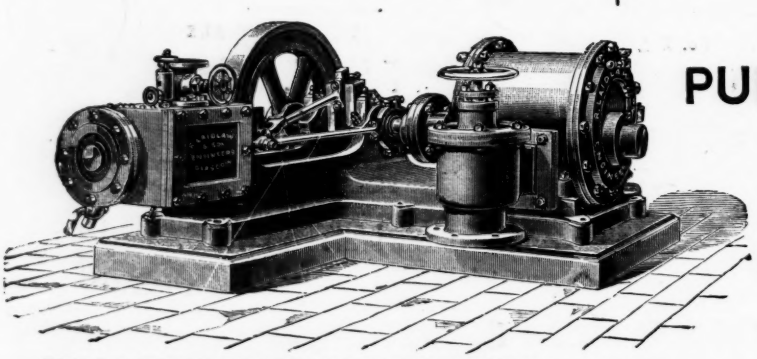

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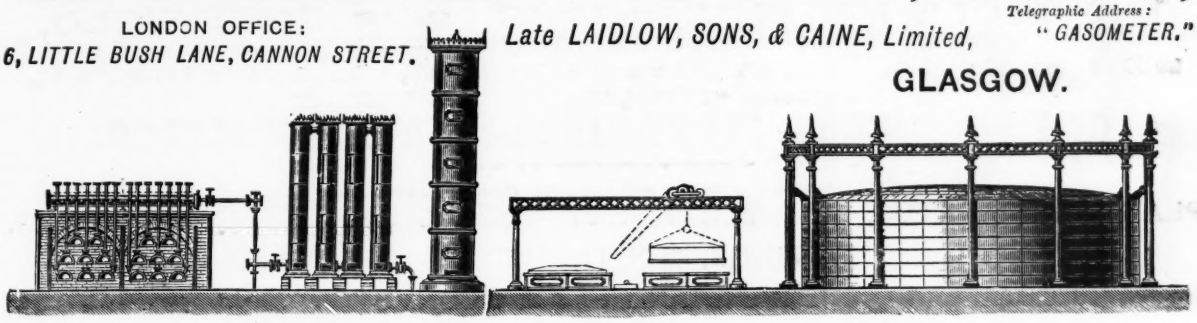

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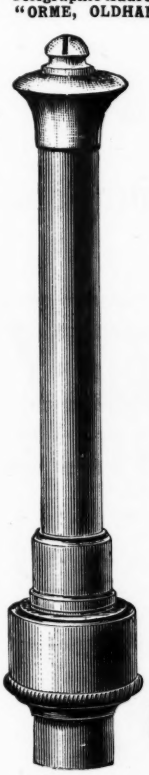

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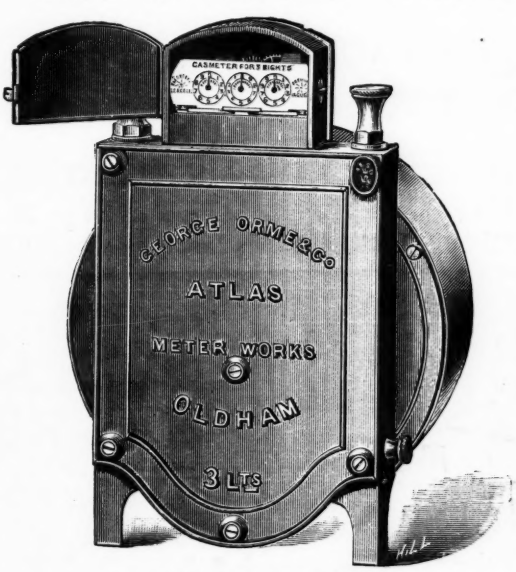

WET GAS-METER IN CAST-IRON CASE.

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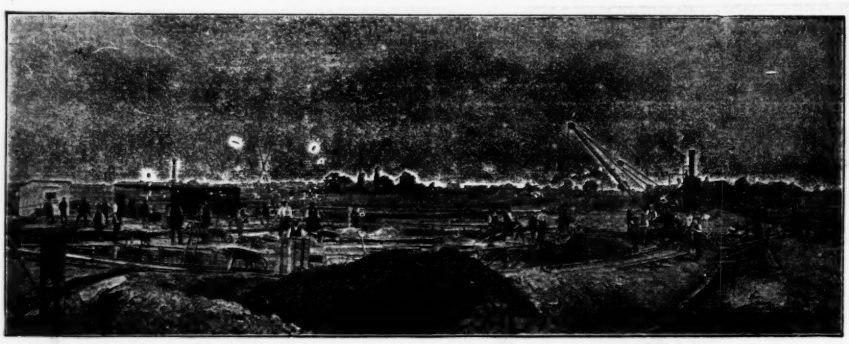

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FIRE BRICKS, LUMPS, & TILES; BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c., &c.

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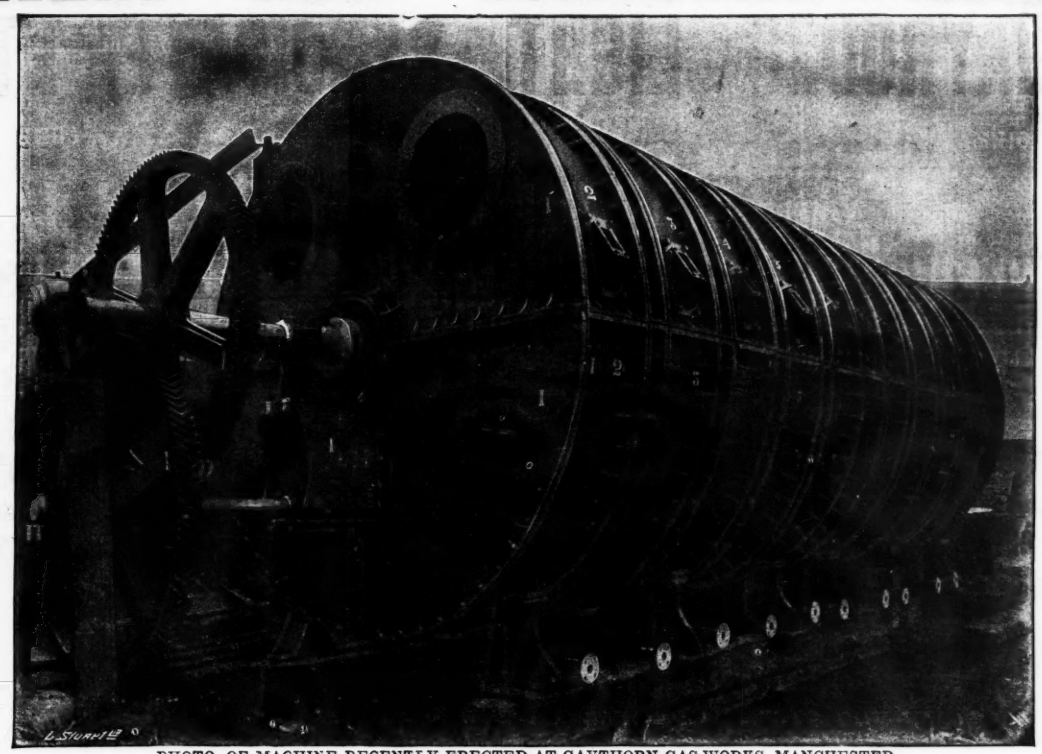

RESULTS GUARANTEED.

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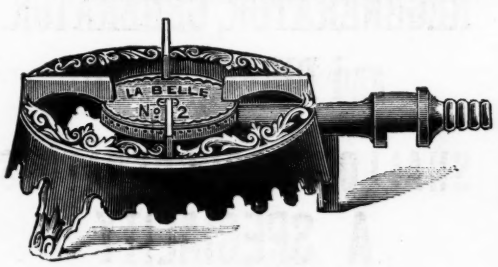

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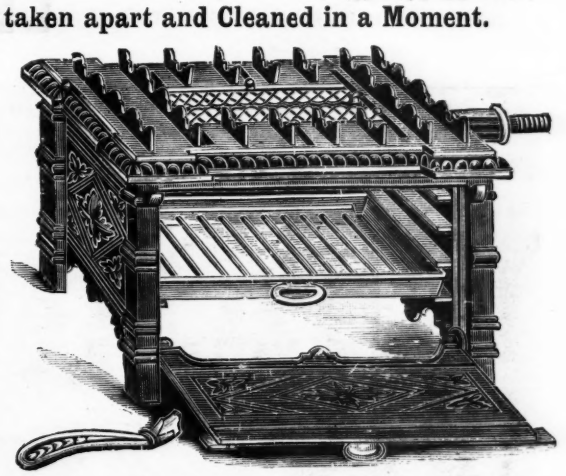

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PRICE COMPLETE WITH MANTLE

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INCLINED, HORIZONTAL,
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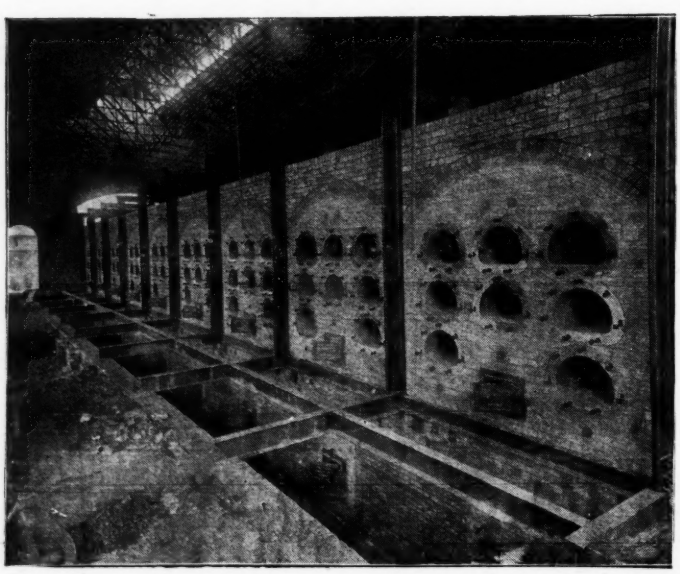

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MANY INSTALLATIONS.
EXCELLENT RESULTS OBTAINED.

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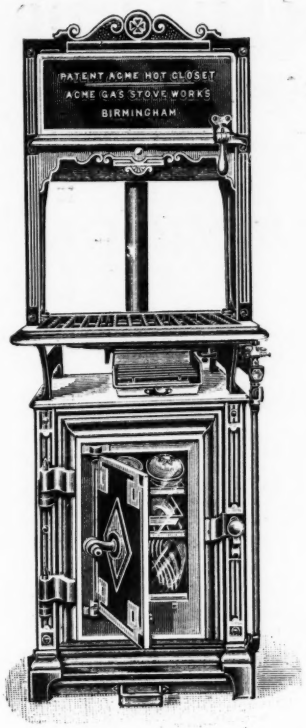
THE LATEST AND MOST SUCCESSFUL DEVELOPMENT IN GAS-STOVES.



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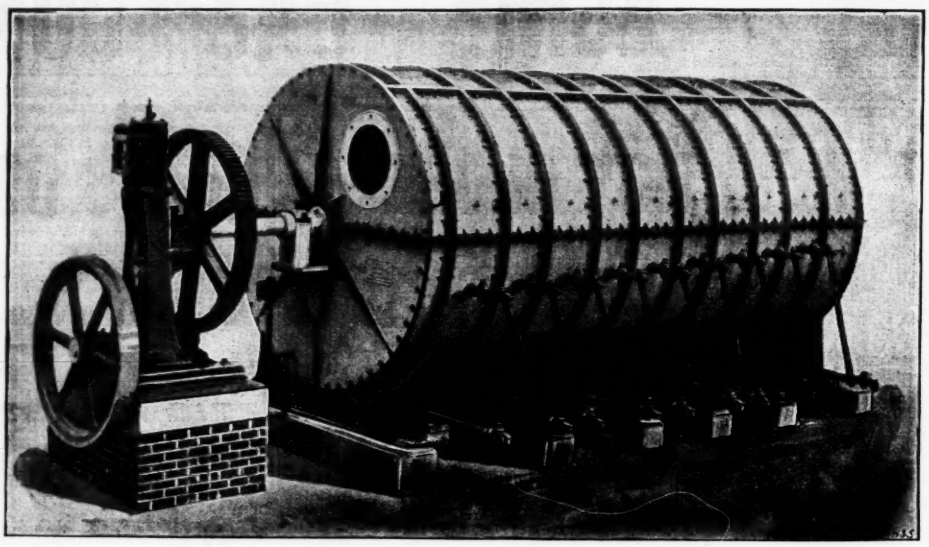
Maximum Strength Liquor produced, Minimum Water Supply and Driving Power required.



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Nearly 600 in use.

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Brussels	750,000	Shanghai	225,000	Rotterdam	850,000
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Swansea	750,000	Stockton-on-Tees	500,000	Scarborough	800,000
Manchester	3,500,000	Edinburgh	2,000,000	Perth, W.A.	125,000
Brighton	1,750,000	Guildford	350,000	Bremen	550,000
Preston	1,400,000	Brentford	1,200,000	Maidenhead	225,000
New York	1,200,000	Syracuse, N.Y.	850,000	Epsom	225,000
Southport	750,000	Bridlington	150,000	North Middlesex.	150,000
Bath	1,000,000	Middlesbrough	1,250,000	Wandsworth.	1,800,000
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Hartlepool	750,000	Brussels	1,000,000	Staines	600,000
Utrecht	1,000,000	Brighton (Second)	1,850,000	Commercial (Fourth)	2,000,000
Deventer	150,000	Stockport (Second)	600,000	Dublin (Second)	2,000,000
Portsmouth	1,000,000	Croydon (Second)	625,000	Faversham	200,000
Bournemouth	1,000,000	Maidenhead (Second)	225,000	Birmingham (Swan V'ge)	1,500,000
Aylesbury	150,000	G.L.&C.Co., Beckton	2,250,000	St. Gallen (Switz.)	225,000
Hamburg	1,750,000	G.L.&C.Co., Fulham	1,750,000	Colney Hatch	400,000
Redhill	275,000	Tottenham (Third)	350,000	Southampton (Second)	500,000
Dublin	2,000,000	Sydney (Harbour)	500,000	Tunbridge Wells	1,000,000
Posen	450,000	Sydney (Mortlake)	500,000	Hebden Bridge	200,000
Dunedin (N.Z.)	150,000	Manchester (Second)	3,500,000	Chorley	300,000
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United States Total 236,800,000 Cubic Feet Daily.

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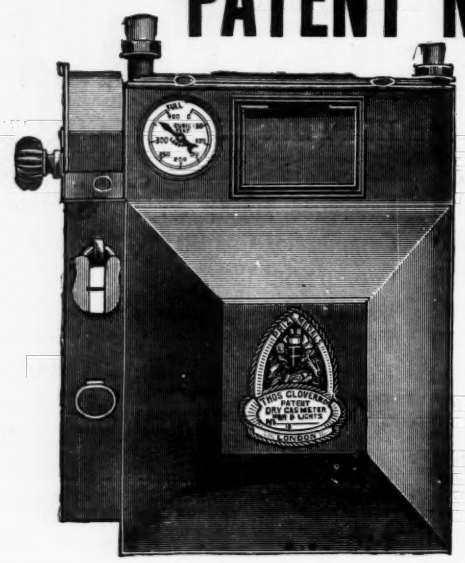

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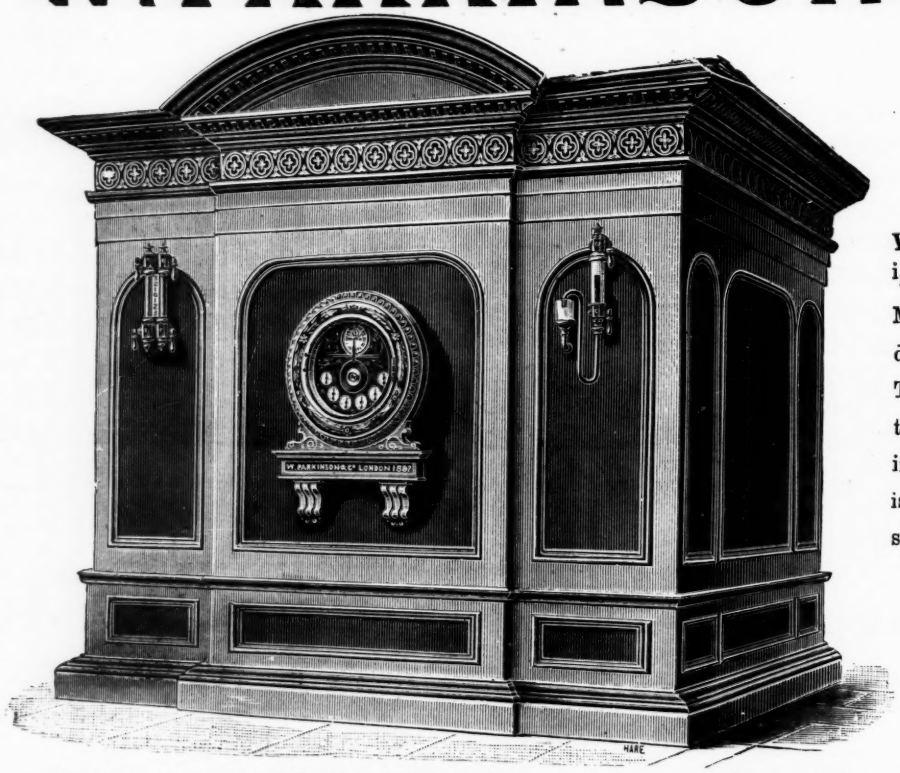

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

EDITORIAL NOTES.

The Decision of the House of Commons Committee on the London Gas Bills.

THE South Metropolitan Gas Bill was before Mr. Oldroyd's Committee the whole of last week; and on Friday, the decision of the Committee was given on the three London Gas Bills which they have had under consideration, one after another. This decision can only be characterized in popular phraseology as "sensational." The remaining part of the Bill of the London County Council bearing the names of the three London Gas Companies, relating to the regulation of prepayment meter supplies, was cancelled in favour of an agreed clause enacting that the amount of the Companies' charges for gas and fittings shall be distinctly stated to the consumers, and that the maximum charge for meter and fittings is not to exceed 10d. per 1000 cubic feet of gas consumed, subject to revision by the Board of Trade in seven years. The acceptance of this reasonable and harmless clause, in substitution for the harsh and crude proposals originally contained in the Bill, is to be regarded merely as "saving the face" of the London County Council. The Parliamentary Committee of this body will not have the mortification of reporting the complete discomfiture of their gratuitous legislative attack upon the Gas Companies. Better an Act of one clause than no Act at all, even though the one clause bears no sort of resemblance to the scheme which it displaces! Actually, the Committee only saved the Bill because it afforded the sole parliamentary means of applying to all three Companies whatever reasonable regulation of prepayment meter charges might be agreed upon. The only London Gas Company with a Bill in Parliament this session to raise the question on their own account, was the South Metropolitan. Their Bill offered to take a maximum surcharge of 9d. per 1000 cubic feet; though this admittedly would not pay. As it has been settled, therefore, the South Metropolitan Company get a penny more than they asked for; and the other Companies are equally well satisfied. Whether the London County Council will think, with Dickens's charity schoolboy, that "it was hardly worth while going through so much to get "so little," remains to be seen.

The Bill of the Gaslight and Coke Company was thrown out. The gravity of this second failure of the Company to obtain the sanction of Parliament to the raising of the additional capital they declare to be necessary to enable them to fulfil their statutory obligations, cannot be overrated. The effect produced upon those interested in the matter who heard the announcement of the rejection of the preamble, was nothing short of blank consternation. Habitual frequenters of the corridor, who knew the circumstances, could only "stand at gaze," and ask one another what the Company are to do next. Such drastic chastisement of a Gas Company is scarcely precedented in parliamentary annals. The Bill was opposed, it is true; but no evidence was offered to show that the Company did not want the money, or at least a substantial part of it, or that the method by which the Company proposed to obtain it is not the cheapest possible. But, unfortunately for the promoters, the Bill did not contain a line in recognition of the labours of the Powers of Charge Committee of last session; and the House of Commons had passed an instruction to this Committee to the purpose that the fruit of that inquiry should not be thrown away. Counsel for the Company said in effect: "Give us our money; "and then we will talk about those recommendations." But, as a matter of fact, it was difficult to see where the recommendations were to be let into the Company's scheme. It was contended that so much of them as applied to capital did not affect debenture stock; and there were other objections to the remaining recommendations. All this was perfectly rational, of course, as advanced for the promoters; but it was open to the fatal retort that it simmered down into the general conclusion that, so long as the Company had recourse to mortgaging their undertaking at 3 per cent., they could hold Sir James Rankin's Committee at arm's length. There was also the further general weakness of the Company's proposal, that it tended more and more to make the ordinary shareholders mere annuitants on the pledged undertaking. It sounds very well to say that the benefit of all economies effected by a sliding-scale company goes, five-sixths to the consumers and one-sixth to the shareholders. There is

another side to this statement. It is, however, unnecessary to discuss the matter any further at the present crisis in the Company's affairs. The people of West Ham decline to resign themselves to going on paying so much more for gas than they think is fair, merely because Colonel Makins holds that the price on the north of the Thames has always been more than that charged on the south, and always will be. The Corporation of the City of London are disappointed at the net result of the Chartered amalgamations. The London County Council could show —what they could not do for their own Bill—that in opposing the Company's Bill they were acting on the instigation of practically all the Local Authorities within the district. It is an unfortunate business for the proprietors; but it cannot be pleaded that the Horseferry Road has not been warned that its ways did not command the approbation of Parliament.

With regard to the South Metropolitan Bill, which may be shortly described as a measure for enabling the Company to discontinue the artificial enrichment of their gas to the legal 16-candle standard, the astonishing thing happened that the Committee accepted the proofs offered as to the expediency of the alteration with more heartiness than the Company themselves desired. The Bill started with the supreme advantage of being a practical embodiment of the best of the recommendations of the Powers of Charge Committee. It was no flash project, suddenly sprung upon Parliament, like the Portable Photometer Bill of the London County Council. In reality, the facts about enriched gas have been understood by the South Metropolitan and other Companies, and by experts, for years; but the most ardent reformer would have had small hopes of convincing Parliament of the truth, in the absence of such a favourable opening as the present circumstances combined to offer for a sweeping reconsideration of the convention of statutory illuminating power. The coincidence of favouring conditions for this reform is particularly striking and extraordinary. First came the report of the Powers of Charge Committee, which gave a lead to the South Metropolitan administration that, as men of business and of their Age, they could not refuse. Was ever before a Gas Company actually offered an increase of dividend without asking? But, of course, there were conditions; and the Gas Company wisely gave their own turn to these. They also prudently "bettered the instruction," by offering to give the sliding-scale a fresh start in the downward direction. It does not appear to have been remarked in the course of these deeply interesting Committee proceedings, that the sliding-scale necessarily tends to arrest itself when the irreducible minimum of compressibility of the working expenses has been reached. The South Metropolitan selling price at the beginning of the year was down to 2s. 1d. per 1000 cubic feet; and this was probably the anchorage for the downward range. Since then there has been a change in the upward direction. A fresh minimum can only be realized, under ordinary conditions, by altering some datum, which is obviously the statutory illuminating power, in the case of an undertaking not already possessed of the utmost liberty in this respect. The London standard of illuminating power—16 candles—is an artificial one. Mr. Livesey saw in the relaxation of the obligation on the Company supplying this gas to enrich the bulk of the make, a means of cutting down the initial price. His Bill, therefore, offered to do this, in addition to accepting the recommendation of the Powers of Charge Committee on the same subject, at the rate of a penny per candle power actual reduction on the average of the output.

The Committee went with him willingly—nay, eagerly. They saw the inutility of enrichment, their eyes having been opened in the course of the proceedings on the Portable Photometer Bill, which had with them an effect wholly different from that designed by its promoters. In point of fact, the Bill established the advantages of the South Metropolitan proposal, which was certainly not intended by the London County Council. There could not have been a better introduction to the South Metropolitan Bill; and if the latter had stood alone, it would have been necessary to invoke in support of its proposals very much the same kind of evidence as that by which the London County Council fondly sought to bind the London gas industry tighter than ever in the bonds of red-tape photometry. The only fault of the South Metropolitan case was that the Company offered too much. The necessity for raising the price of gas, to meet the increased cost of coal, has arisen since the decision to promote the Bill was taken; and it gravely affects the financial prospects of the Company for the year For how long this disturbance may last, is another consideration altogether. At present, the Committee have placed a difficulty in the way of the Company, by suggesting that they should take a fixed standard of 14-candle power, and a correspondingly fixed initial price of 3s. 1d.; all provisions of testing and penalties remaining as of yore. This is not the same thing as Mr. Livesey's proposal of an adjustable initial price based on the average illuminating power found at the official testing-stations. It repeats the rigidity of the existing system of gas-testing, which it was partly Mr. Livesey's object to relieve. This portion of the Company's case was evidently insufficiently proved. At any rate, the finding of the Committee is a great triumph for the Company, and even as it stands is a huge measure of emancipation for the gas consumer. Generally speaking, also, it is another victory of intelligence and progress over the forces of obscurantism and officialism.

The Conversion of Alderman Gibson, of Manchester.

"STILL it moves," said Galileo, speaking of the earth in its orbit; and the observation is recalled by an interesting report, in another column, of the conversion of Alderman Gibson, the Chairman of the Manchester Corporation Gas Committee, to the true faith in matters of municipal gas administration. Granted, the worthy Alderman is in a minority as yet; but seeing that he has only lately raised his banner, it is too much to expect that his cause should immediately prevail against all the forces of use and wont ranged on the other side. The conversion happened in this way: Manchester, like other places, has to face a largely increased coal bill, the natural effect of which would be to diminish the amount of the usual subsidy allocated out of the gas profits to the city fund. The electric lighting business, for other reasons, would not be in a position to hand over any surplus profit at all. In these circumstances, the City Council directed the Committees to revise their estimates, and as a result the Gas Committee proposed to increase the price of gas over the district by 3d. per 1000 cubic feet. The object of this was simply and solely to make up the amount of the usual subsidy of £52,000 a year to the city funds. The resolution to so tax the gas consumer for the benefit of the ratepayer, was arrived at by the Gas Committee in the enforced absence of their Chairman (Alderman Gibson); and the moment he had a chance of doing so, he opposed the increase of price in the City Council. The speech in which Alderman Gibson delivered his soul on this point of policy is worth reading by all municipalizers. So long as the matter of gas consumer *versus* ratepayer was as broad as it was long—while the cause of the gas consumer was, roughly speaking, that of the ratepayer—Alderman Gibson hardly thought it worth while to make a fuss about the robbing of Peter to pay Paul. For years, however, the position of the two interests has been slowly changing. Nowadays the large ratepayers are not the largest gas consumers, as they were a few years back—they mostly use electric light. In addition, the prepayment meter consumer has arisen; and he does not pay rates directly at all. The gas consumer, large or small, is to be taxed for the benefit of the ratepayer, who in each of these leading classes is a different person. Well might Alderman Gibson say that when Parliament heard of what Manchester was doing in this regard, it would be good-bye to municipal trading. This proceeding, indeed, "lets the cat out of "the bag." Why do Local Authorities want to trade? For the benefit of the consumer or the purchaser of their commodities? Not a bit of it. It is because they want to give their rates an illusory appearance of being low, to their own honour and glory. The proposal to increase the price of municipal gas or electricity, in order to make ends meet, is a perfectly legitimate one; but that of charging all consumers of Manchester gas 3d. per 1000 cubic feet more, in order that the Gas Committee may subsidize the rates of the city to the amount of £52,000 a year, is a monstrous abuse.

The Cost of Fussiness.

THE plea uttered by Sir Michael Hicks-Beach at Bristol on Wednesday last, for a greater national regard to the ancient virtue of economy, followed, with special appropriateness, the announcement made the previous day by Mr. Wallace Bruce, at the weekly meeting of the London County Council, that the Metropolitan ratepayer's bill for

his proportion of that authority's expenditure during the current financial year will be calculated at 1s. 2¾d. in the pound of assessment, compared with 1s. 1½d. for the past twelve months. The ratepayer is asked to find consolation in the fact that even now he will not be paying so high a rate as he did in 1895-6, when it was 1s. 3d. in the pound. But as the apparent difference in his favour is solely due to the large increase in the assessment of London in the interim, and he is told, moreover, that he must anticipate still heavier rates in the future—the source of increased income referred to (higher assessments) being "for the "present exhausted"—the comparison with the earlier and higher rates (not payments) is little likely to be reckoned as adequate compensation. It is to be hoped, by the way, that the Local Authorities, when revaluing the gas undertakings of the Metropolis this year, will agree with the view of Mr. Bruce as to the possibility of increase being exhausted. The higher rates will be a sufficiently serious matter for them.

The growth of the total rates levied in the Metropolis during the past few years has, indeed, been a matter of no small consideration to an industry whose property is assessed at something like a million and a quarter. Taking three rates only—all outside those levied to meet local expenditure—and comparing them now with the same rates five years ago, we find the County Council requiring 1s. 2¾d., the School Board 1s. 2d., and the Asylums Board 5d. for the current year—a total of 2s. 9¾d., as compared with a County Council rate of 1s. 3d., a School Board precept of 11½d., and an Asylums expenditure of 3d. for 1895-6—a total of 2s. 5½d. The difference of 4¼d. represents between £20,000 and £25,000 a year increase in the rates paid by the Metropolitan Gas Companies.

Much of this increase is doubtless due to needed and justifiable expenditure. Some of it at any rate we know is not. The amount of money wasted annually by the London County Council upon pet parliamentary projects—their ambition to have a finger in everybody else's pie besides the very big one set before them, with its resultant Water Schemes, Portable Photometer Bill, and what not—is, in particular, a perfect scandal. Ordinary mortals would be quite (or more than) content to have on their hands the every-day working of this vast city of ours, involving incidentally such jobs as the Holborn-Strand thoroughfare, to mention one of the many urgently-needed improvements which the Council have on their hands. But the special type of Progressive with which we are blessed has a soul above merely parochial affairs, and would like to be a municipal Universal Provider. He is, however, likely to have his wings clipped at the polls so soon as his ambitions begin to take their full effect upon the rates; and it is obviously impossible to continue increasing the municipal indebtedness without eventually sending up the rate in the pound. The more foreseeing of the councillors are beginning to feel some misgivings on this score. Mr. Wallace Bruce laid stress upon the fact that, taking into consideration the schemes already arranged for, the debt-charge was certain to be an increasing one; and he warned the Council that all work not actually urgent should be postponed. We would suggest, for a commencement, that much of the parliamentary work on which the Council annually spends some thousands of pounds falls within this category of "not actually urgent." And in that opinion the House of Commons certainly appears to share.

A Shady Side of Municipalism.

A CURIOUS illustration of the way in which questions of practical politics of the most diverse natures jostle one another in the minds of public men, occurred in the course of last Friday's proceedings of Mr. Oldroyd's Committee. The night before, the House of Commons had passed the Government Bill to compel—or rather to empower—local authorities to better provide for the housing of the working classes of towns, by enabling such authorities to buy land for the purpose outside their own districts. This measure was much criticized on all sides, mainly on the ground that it was not big enough, did not go far enough, was piecemeal legislation, and so forth. The Government defended their Bill on the broad ground that all real progress in these matters must be by steps; and that there can be no more mischievous fallacy for a Legislature to adopt than the notion that what are called "comprehen-"sive" schemes of reform are the only or the best way of attacking the ills of the body politic. The very same argument, in a slightly altered shape, was used by Lord Robert Cecil—who owned that he had not followed the previous night's debate—on behalf of the proposal to allow one of the London Gas Companies to make an innovation upon the established practice of all the Companies in regard to one particular. It had been objected to the South Metropolitan project that it would disturb what was declared to be a precious uniformity in the London Gas Supply, which was tantamount to saying that nothing must ever get out of its statutory rut. Lord Robert Cecil, however, completely pulverized this contention; conclusively showing once more that there can be no progress without difference, and that all real advance must be by steps. When one remembers how strongly the influence of statutory protection and regulation of an interest or an industry acts to lull its official caretakers into a "Sleepy "Hollow" existence, how fatuous appears the inevitable bureaucratic opposition with which every single indication of enterprise on the part of such undertakings is met! To show no sign of bustling life; to go on the jog-trot of statutory duty; to satisfy all official tests and keep all officials in countenance—that is the way to please the bureaucracy of every clime and age.

The canker of *fonctionnairisme*, as it is happily styled in the language of the people who suffer so much from this disease of civilization, has infected British municipal administration more deeply, in places, than the public suspect. Some localities exhibit it more than others. Where there is a quick and lively flow of the best business blood of a town through the municipal offices, it does not appear at all. It would be invidious to single out examples of this clean and healthy Municipalism, which happily exists among us in many towns, irrespective of their size. Here the Town Clerk and all the other important officers of the local commonwealth are the stewards and servants of the community, so that there is no distinction possible between the interests of the Town Hall and those of the townspeople. The members of the Common Council are truly representative men, and are themselves inspired with the spirit and in accord with the desires of the various classes of citizens to which they belong. Very different, unfortunately, is the case of many places that could be named. Here the Town Hall has its own policy; and those councillors who do not belong to the inner ring are very much "out of it" in everything else as well. The most prominent figures of the Municipality are mountebanks, at the mention of whose names the ordinary man of business either swears or smiles, according to his temperament. Nobody in the town either knows or cares what the local magnates will do next. The best men of all classes keep out of public office in sheer disgust. The self-appointed "Labour leaders" in the Council are men who never did a day's hard work in their lives. The aldermen are either fossils or absentees. The picture is not a pleasant one; but it is true. Nor is it the worst that could be drawn. The advent into this country of electric tramway companies is already introducing into English and Irish municipal life some of the worst features of American town politics. It is said that in the United States the street railway companies own the towns; and this is what they are trying to repeat over here. Already the tramway companies "run" their candidates for election on the district and town councils. They are accomplished electioneerers, whatever they may be as electricians. Then when they go to Parliament, the voice of the local authority they have helped to constitute is accepted as that of the inhabitants of the locality. The future of British Municipalism is anything but cloudless.

The Spirit of Sweet Reasonableness in a Trade Union.

THE annual report of the United Society of Boiler Makers and Iron Shipbuilders, recently issued, deserves passing notice on account of the spirit of reasonableness and the real common sense which characterize its general observations—a reasonableness and sensibility which, if they could only be generally diffused among Trade Unionists, would do much to lessen the occasions of friction between masters and men. The report comments upon the fact that, owing to the glut of shipbuilding orders in the past year, and the consequent inability of builders to undertake to complete proffered orders within the time allowed, not a few of them left our shores and were placed abroad; and it then calls attention to the possible future effect of such a diversion of business upon the shipbuilding industry of this country

when the trade returns—as it is rapidly returning—to normal conditions, and points a wholesome moral for the members of the Society. "Work once lost is hard to re-"cover again, and [the transfer of orders abroad] should "prove to all workmen, the Society's members included, "the necessity of keeping good time, and thereby doing "their part towards helping ship producers to retain their "position." How true, and how generally forgotten by the Trade Union agitator and his dupes!

The report proceeds to refer with much satisfaction to the fact that the past year has been singularly free from any labour difficulties involving great issues; and it then makes some very sensible observations upon a frequent source of irritation between engineering employers and their men—namely, questions of demarcation. Difficulties arising therefrom have, the report points out, caused, from time to time during the past year, a little uneasiness; but "although such questions are vexatious, yet there is not "the slightest reason why they should not, as time rolls "on, be even more readily adjusted than hitherto, espe-"cially if those concerned will give just consideration to "the class of material used, the class of work to which "the disputed job is more closely allied, and, most im-"portant of all, allow reason and common sense the right "to decide, not allowing obstinacy and unreasoning dogged-"ness to prevail." If only that "most important of all" clause could be printed in large letters, framed and hung up in every workshop in the kingdom, and allowed to influence the conduct of the men, what a different country ours would be.

We must be allowed one more quotation from this report—which we should like to feel we could hail as a sign of better times, but are lamentably pessimistic thereupon—and that quotation is from the concluding remarks of the General Secretary, who, after expressing the hope that the future may witness a great desire on the part of the members to educate themselves, and to do the best work they can, says:

> I know it may be said that, in these days of machine labour and competition, it is difficult to put one's personality into one's daily work, and that man becomes daily more and more but a piece of machinery; yet I make bold to say that, machinery and competition notwithstanding, all true men feel a glow of pride when they have accomplished any excellent piece of work, from the best and highest art to the very humblest piece of labour it is possible to perform.

It has so often been our duty to comment adversely upon the unenlightened and mischievous utterances of Trade Union officials—blind, often wilfully blind, leaders of the blind—that it is a pleasure to put on record the courageously sane declarations of the Boiler Makers' Executive. May their influence grow and prevail.

The Committee on Municipal Trading.—The Joint Committee of the Lords and Commons on the subject of Municipal Trading is constituted as follows: Earl Crewe, Viscounts Hampden and Peel, Lords Windsor and Rothschild, Sir Walter Foster, Sir Leonard Lyell, Mr. Lewis Fry, Mr. Hobhouse, and Mr. Grant Lawson. The Committee met for the first time on Thursday to select a Chairman and arrange the order of business.

Patents in the Past Year.—The report of the Comptroller-General of the Patent Office for 1899 shows that there were 25,786 applications for patents, and 20,015 provisional and 14,005 complete specifications submitted, while the number sealed was 14,160. The number of applications for designs was 19,495, and the number registered 18,470. Trade-mark applications numbered 8927. The receipts from patent fees amounted to £202,977, as compared with £200,418 in the previous year. The increase in acetylene lamp patents has been accompanied by a considerable decrease in those for oil and incandescent lamps.

A Century of Chemistry at the Royal Institution.—Professor Dewar delivered the second of his lectures on the above subject on the 3rd inst. Continuing his examination of the work of Davy, he showed how the electro-chemical theory had originated and been developed. He attributed to Davy the first clear and philosophic conception of an element as simply a body which cannot be decomposed by any methods at our command. The lecturer emphasized the fact that it was the invention of the safety-lamp which gave Davy a place in popular estimation which his abstract researches would hardly have won for him. He repeated Davy's experiments on flame; pointing out how steadily he moved onward by well-ordered stages to a complete understanding of the fundamental problem involved in providing a safe light for miners. Showing the enormous pressures developed by an explosive wave travelling in long galleries, Professor Dewar noted that in some conditions occurring in modern mines the Davy lamp might not afford absolute protection. This, however, did not detract from the value either of the practical invention or of the admirable scientific work which made it possible.

WATER AND SANITARY AFFAIRS.

THE East London Water-Works Company are to be congratulated on having piloted safely through the House of Commons Committee of which Colonel Gunter is Chairman, the Bill by which they are seeking the powers denied to them by the Upper House last session. The Company wish to build two reservoirs which will give them additional storage to the extent of 5300 million gallons, and bring their total up to 7500 million gallons. They also desire to be in a position to draw from the Thames, with the consent of the Local Government Board and the Conservators, an extra supply of water in cases of emergency—the quantity to be taken not to exceed 30 million gallons in one day, or in one half year more than such quantity as would be equal to a daily average of 10 million gallons. For the purposes specified in the Bill, and others on which capital may legitimately be expended, the promoters asked for authority to raise £1,800,000. The proposals of the Company were objected to mainly by the County Councils of London, Middlesex, and Hertfordshire. Mr. W. H. Dickinson, now the Chairman of the first-named Council, and for some time Chairman of its Water Committee, gave expression to the views of a certain section of that body by characterizing the proposed works as unnecessary, in view of the existence of the intercommunication scheme, and, moreover, as an extravagant way of providing water for East London, seeing that the whole supply would in the future be in the hands of a Central Authority. Sir Alexander Binnie naturally supported his Chairman. He pointed out that last year—a time of drought—the Company, with half their authorized storage, were able, by the aid of other Companies, to supply their district; and the inference to be drawn from his evidence was that no additional powers were needed. Sir Alexander did not tell the Committee how far the County Council were instrumental in securing the passing of the measure which rendered this assistance possible. But although this help is available, it would be manifestly better for the Company to resort to their neighbours only in cases of emergency. Sir Frederick Bramwell took a different view of the matter. He said the proposed scheme would do for the Lea just what the Staines scheme will shortly do for the Thames—relieve the river when it is full, and store the water for use in times of drought. The weighty engineering evidence given to the Committee for the promoters satisfied them. The opposition of the Hertfordshire County Council was based upon a fear that the Company were going to use some of their new capital for sinking additional wells in the county; but on being satisfied on this and other points, they withdrew. Their neighbours in Middlesex submitted that no case of real necessity for the Bill had been proved, and that therefore it should be rejected. The Committee did not agree with them, for they passed the preamble and subsequently settled the clauses, including the now familiar "sterilization" clause. There appears, therefore, to be every prospect of the measure going safely through the other House.

A less satisfactory result, from the promoters' point of view, attended the inquiry by a Committee of the House of Lords, presided over by the Earl of Lauderdale, into the Bills promoted by the Local Authorities of South Essex to obtain parliamentary sanction for the constitution of a Water Board to acquire the undertaking of the South Essex Water Company and construct additional works for the supply of the district, and by the Company for an extension of their works and limits of supply and for additional capital. The combined authorities were before Parliament in virtue of a pledge given to a Committee last session that they would formulate a scheme for the water supply of their district; and on this understanding the Committee threw out the Bill promoted by the Company. The associated authorities entrusted the engineering part of their case to Messrs. Rofe and Mansergh; and their Bill appears to have had the almost unanimous support of the inhabitants. At the same time it encountered strong opposition from various quarters, on the ground that the carrying out of the project would have a very deleterious effect upon the water supply in the Cam Valley. The East London Water Company condemned the scheme as one likely to result in financial failure, and one, moreover, for which there was no necessity; and the Company more immediately concerned protested against being ousted from a position in which they believe they have done their duty.

They characterized the scheme as the worst which had ever been presented to Parliament. Hertfordshire was alarmed at the effect which the sinking of the proposed wells would have upon the county; and Cambridgeshire contemplated the draining of the Cam to the point of exhaustion as the result of carrying out the suggested works. A good deal of evidence had been prepared on these lines; but the Committee were evidently satisfied that there was no justification for constituting the proposed Board. With regard to the Company's application, an increased supply of water was acknowledged to be needed for their district; and it was proposed to construct works to augment the present 2¼ million gallons to 5½ millions, which would, it was stated, suffice for the next fifteen years, and supply double the existing population. Though evidence in support of the Company's Bill was given by two such competent experts as Mr. E. K. Burstal and Mr. Baldwin Latham, the Committee rejected it as well as the other. We are rather surprised at their decision. The creation of a new body may not have been necessary; but if, as the Committee were assured, the population of the district is increasing by "leaps and bounds," the Company entrusted by Parliament with the duty of providing it with a necessary of life were surely justified in asking for such additional powers as would enable them to discharge that duty more efficiently.

There was a certain air of placidity at the half-yearly meeting of the West Middlesex Water-Works Company on Tuesday, resulting doubtless from the temporary relief from agitation brought about by the *quietus* given for the present session to the projects of those arch-enemies of the London Water Companies, the Progressives of the London County Council, and by the announcement by the Directors that they were in a position to recommend a dividend at the rate of 10 per cent. per annum. Their report was mainly a review of recent events connected with the water supply of the Metropolis; and the speech of the Chairman (Mr. Edmund Boulnois, M.P.) was little more than an amplification of that document. It was nevertheless interesting from the fact that Mr. Boulnois occupies a seat both at Spring Gardens and at St. Stephen's, and thus he is in a position to give the shareholders his personal opinions as to what goes on in both assemblies. He spoke in highly appreciative terms of the manner in which Lord Llandaff conducted the important inquiry entrusted to him and his colleagues, and expressed his individual belief that not a single thing that could be examined, whether for one side or the other, was left untried. That the Water Companies came out of the trial as well as they did was due to the fact that their opponents were unable to prove their case—in truth, they had no case. Though Mr. Boulnois does not think there is any probability of the County Council attacking the Companies in the immediate future, he confessed that he would not be surprised—knowing the parties as he does—at their making some attempt to spend a little more of the ratepayers' money in harassing the Companies. In fact, signs are not wanting of a movement in this direction. How much has already been squandered in this way we shall know when the return on this subject which is understood to be in preparation by the Council is issued. However, for the present there is peace, and the Company are pushing on with works to help them to meet their increasing business. They have a large district in the neighbourhood of Willesden, which is being rapidly covered with houses; and the new services laid on during the past half year brought up the total to 85,356, of which 80,875 are under constant supply. While the requirements of the consumers are thus being fully met, their pecuniary interests are not left out of consideration by the Directors; the rebate of 10 per cent. from the statutory water-rates—amounting now to about £28,000 per annum—having been continued to all the Company's customers. This is a by no means inconsiderable concession, which is jeopardized by every hostile action on the part of the Progressives at Spring Gardens.

By the will of the late Mr. G. J. Symons, F.R S., a valuable bequest is made to the Royal Meteorological Society. Mr. Symons was a great lover of old books, and succeeded in getting together an extensive meteorological library. He bequeathed to the Society all his books, pamphlets, maps, and photographs a copy of which is not already in the library; also his Cross of the Legion of Honour, his Albert medal and other decorations, the testimonial album presented to him by the Fellows of the Society in 1879, and the sum of £200.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1392.)

THE Stock Exchange has had a much brighter week. Thanks to the pronounced relaxation of stringency in the Money Market, and to the continuance of good news from the seat of war (culminating on Saturday in the relief of Mafeking), there was a steady improvement all round; and prices of almost all descriptions have advanced. But still business was always somewhat restricted to the inside circle; and the public did not rush in. Consequently, towards the close there was the usual profit-snatching, which administered a slight check to the advance. The settlement was got through without any difficulty of importance. The supply of money continued very abundant, amply sufficient to cope with all demands in addition to the requirements of the Stock Exchange; and discount rates have declined materially. The Gas Market naturally offers an exception to the general advance in values; the process of reduction of quotations to harmonize with the altered conditions of the coal supply being still in progress. There are a good many changes to note; and all downward, with one significant exception. The chief interest in regard to the Metropolitan Companies has lain in the Parliamentary Committee Room, where the unworthy attempt to legalize rough-and-ready haphazard photometry was defeated, and the ill-conceived scheme for fettering free trade in fittings resulted in the local authority practically accepting what the Companies have voluntarily been doing without demanding to be harassed. The Gaslight Company have not carried their Bill; and the ordinary stock was flat. It opened at par; but the final mark was no better than 96½. Very little was done in the secured issues; but the preference fell a point. South Metropolitan scored an advance early in the week; but the Company's later success with their Bill did not seem to catch the market's eye. Commercials, old and new, were steady; but the debenture lost a point. More or less considerable amendments were made in the Suburban and Provincial quotations, affecting Brentford, Brighton, and Tottenham. Business was very limited in the Continental Companies; and prices fell for Imperial, Union, and European. Nothing occurred among the remoter Companies, beyond a slight fall in River Plate. In the Water Companies, there was again a general set-back of prices, but not severe.

The daily operations were: Business was very quiet on Monday; but changes were numerous. Brentford new fell 5, Union 2½, both Brightons 2, Gaslight ordinary and preference 1 each, Imperial 1, River Plate ¼, South Metropolitan debenture 1; but the ordinary rose ½. In Water, East London and Southwark fell 3, ditto "D" 2, New River 2, and West Middlesex 1. Tuesday was a busier day; and South Metropolitan rose 1. Wednesday fell quite quiet; and prices did not move. Thursday's transactions were also very limited; and Gaslight ordinary relapsed 1. In Water, West Middlesex was set back 1, Lambeth 2, ditto 7½ per cent. 1, and Grand Junction ½. On Friday there was considerable dealing in Gaslight ordinary; but nothing moved, except Commercial debenture, which was 1 lower. Saturday was a quiet day; but a number of changes were made. Gaslight ordinary fell 1½, both Europeans ½, Tottenham "A" 17½, and ditto "B" 3½.

ELECTRIC LIGHTING MEMORANDA.

Electrical Schemes at Westminster—The Electrical Business of the Brighton Corporation—Touting in the Midlands—The "Electrician" Replies.

THE consulting electrical engineers and their natural allies—or opponents, as occasion serves—the mechanical engineers, have been very much in evidence in the Westminster corridors during the past week. Several Committees have been painfully wrestling with phases, and volts, and ampères, and the other fearful wildfowl of the electrical field; and the local atmosphere, usually poisonous enough with other exhalations, has had to bear an extraordinary load of magnetic force. The fortunes of the remarkable proposal to unite Manchester with Liverpool by means of an express electric railway, have been trembling in the balance; and much progress has been made with those particularly "stodgy" Bills which relate to schemes for generating electricity in bulk. Meanwhile, a ray of practicality has been shed over the endless hypothetical discussions on electric traction, by the announcement that the experimental electric trains of the Metropolitan and District Railways are to shortly begin working in the ordinary course at Earl's Court. There is much comfort in the "accomplished fact," in every branch of engineering; and the success of this important venture will have results which it is impossible to foretell.

Great interest naturally attaches to the affairs of the Brighton Corporation Electric Lighting Committee, by reason of the praiseworthy enterprise shown by the Corporation in endeavouring to adapt their system of business to the needs of the smaller householders. The Wright system of charging not only originated at Brighton, but it has been more thoroughly carried out there, under the supervision of the inventor, than anywhere else. The character of the district seems to be peculiarly suitable to the plan. Indeed, the "Electrical Review," in discussing the accounts of the undertaking for the past and previous years,

admits that it is only here that the arrangement has been carried to its logical conclusion, whatever that may be. The charge per unit starts at 7d., and drops to 1d.; the average working out to less than 3d. per unit. Surely, if electric lighting is available for the poor man anywhere, it might be supposed to be so in Brighton. Yet the business does not really pay even here. The capital expenditure is already £291,000, on which there was earned a gross profit of £16,794. Out of this has to be paid interest £7146, and redemption £8099, which leaves what is called a net profit, "carried to reserve fund and credit of rates," of £1549. Not a penny for depreciation! Is this a solvent business? The "Electrical Review" admits that the smallness of the profit balance is not only due to the legitimate influences of reduced price and rising working expenses, but is also referable to the "liability towards special or exceptional outlays for heavy repairs." This evil Brighton shares with Manchester and most other places where the bloom has faded from the generating and distributing plant. In the circumstances, it is high time these prematurely aged municipal electric lighting undertakings were put upon a sounder financial basis. Their secret cannot be kept from the ratepayers for ever.

The Government Inspectors must be sick and weary of listening over and over again to the fables of the usual run of electrical advisers of the small Local Authorities whom their blandishments have assisted to entrap into electric lighting schemes, always warranted to pay handsomely towards the relief of the rates. News of some kinds travels fast enough in these days; but useful information concerning the disappointments of some Municipalities who have trusted these gay deceivers not wisely, but too thoroughly, does not appear to circulate as freely as Divorce Court reports. And when the plunge has been made, with what whole-souled devotion do these Local Authorities commend their new shop to the patronage of possible customers! Even where there is a gas undertaking under the same ownership, the new love is scandalously favoured in preference to the useful old public service. A gas consumer of a Midland town forwards for our inspection a copy of a very creditable "puffing" circular which the town clerk of the enterprising municipality has sent out with the object of ascertaining the volume of trade which the new electrical department of the corporation may expect to have to deal with at the start. This circular sets out the "advantages of the electric light" in due form, among which it is recited that the proposed price of 4d. per unit is equivalent to gas at "about" 2s. per 1000 cubic feet. The local price of gas is from 2s. 8d. to 2s. 5d. per 1000 cubic feet. The good people of the town are further assured that the electric light is "far healthier" than their own gas, and prevents "the injury caused by the moisture, sulphur, and soot given off by gas"—their own gas! It would serve the corporation right if, after they had frightened the people off gas, the dearness and unreliability of their electric light were to drive them to use petroleum for choice.

The "Electrician" has deigned to notice our challenge to establish its claim to the superior accuracy of electricity-meters as compared with gas-meters. This is the way of it: The altogether unwarranted assumption is first made that we supposed our contemporary to have originated the misstatement complained of. Reference to our observations on the subject will completely dispose of this allegation. What we complained of was that the misstatement was repeated by our contemporary, as if it adopted it, without adequate support from the original text. Now we get the additional matter, which turns out to be a purely general statement in extenuation of the inaccuracy of electrical meters. It is here: "It is to be noticed, in addition, that in gas-meters also great accuracy cannot be attained. Owing to the influence of the pressure of the gas, temperature, and the chemical composition of the gas, which primarily determine the heat energy conveyed by the gas, the gas-meter is burdened with so many sources of error as a work-measurer that, as compared with it, the electricity-meter in its present form must be designated as quite an accurate apparatus, even at small loads." What does this amount to? We asked our contemporary to put into figures the reputed accuracy of electrical meters, and gave a statement of the same character referring to gas-meters. Now the "Electrician" calls our challenge a "ridiculous" one. Is it? This is no small matter. We willingly absolve our contemporary from any blame for not having supported the original German statement with figures which, as a matter of fact, were not in the context. But what are the cold facts of the question? We have shown what the gas-meter does, pressure, temperature, &c., notwithstanding. Does the electricity-meter do better? If so, let justice be done. We engage to pillory the gas-meter makers, if it is proved that they are outclassed.

Masons and the Gas Institute Meeting.—A Committee of the Evening Star Lodge has been formed to make arrangements for an Emergency Meeting during Gas Institute week—on somewhat the same lines as in recent years when the Institute has met in London. Monday, June 11, has been the day selected; and invitations (with full particulars) will be forwarded to Masons desiring to attend, on application to the Secretary of the Lodge, Bro. Walter T. Dunn, at No. 47, Fentiman Road, Clapham, S.W.

THE PARIS INTERNATIONAL EXHIBITION.

The Gas Pavilion—The Lighting.

Of the thousand-and-one objects of interest which have been brought together on the banks of the Seine to attract visitors from all parts of the world to the City of Light, those which should first claim the attention of the gas engineer or manager will necessarily be the objects connected with the industry with which he is associated. These will be found in Classes 20, 74, 75, and 87 in the Exhibition, where manufacturers of motors, lighting and heating apparatus, and material used in the construction of gas-works have placed on view a good representative collection of their specialities. But, as readers of the "Journal" are aware, a building has been specially erected to contain a collective exhibit of gas appliances, in order that visitors may have an opportunity of witnessing under one roof the various uses to which gas may be put, whether for lighting or for culinary, heating, or industrial purposes, and the methods and instruments employed for measuring its consumption and testing its quality. The project, it will doubtless be remembered, is in the hands of an Executive Committee, of which M. Eugène Lebon is President. The Gas Pavilion, which was described and illustrated in the "Journal" for the 16th of January last, is a light and graceful structure, erected to the designs of M. Georges Roussi; and, although the arrangement of the contents has been somewhat delayed, this is now being rapidly proceeded with, and it is expected to be completed before the end of the present month. Those members of the Gas Institute who purpose joining the excursion to Paris after the next meeting will consequently have a good opportunity of inspecting the results of the Committee's labours. In having a special building for a collective gas exhibit, they have followed the plan adopted on the occasion of the Exhibition of 1889; and, as on that occasion, the necessary funds have been raised by an appeal to the parties specially interested. The Company with which the names of MM. E. & A. Lebon are associated head the list with 30,000 frs.; the Paris Gas Company follow with 20,000 frs.; and other companies and firms connected with the gas industry contribute sums ranging from 17,000 frs. downwards.

So much for the preliminaries under which the Pavilion has been erected. Before describing its arrangements, regret may be expressed that, in view of its architectural features, a better site than the one allotted could not have been secured for it. As compared with the Pavilion at the 1889 Exhibition, it is practically hidden away. It stands at the very edge of the block of buildings on the eastern side of the Champ de Mars, behind the section devoted to Mines and Metallurgy; the space between the two buildings being rather narrow. At the back of it run the electric railway and the moving platform which make the circuit of the inner sides of the Exhibition buildings on the left bank of the river, a station of the former being immediately adjacent to the north end; it abuts on the Avenue de la Bourdonnais; and it is about 100 yards from one of the main entrances to the Exhibition—that of the Porte Rapp, opposite the end of the avenue of that name. It can therefore be easily reached from this point, to which several lines of omnibuses run; and it can be found with little difficulty from the Eiffel Tower—the usual *rendezvous* of small parties. From the Tower the visitor has only to enter the Palace of Mines and Metallurgy on the left, and go through it in a diagonal direction till he reaches the Swedish Court, when a turn to the left, passing the British exhibits, will bring him out opposite the Pavilion. Or from the Eiffel Tower he may walk for about 200 yards in the direction of the cascade, enter the above-named Palace by the door under the staircase, and pass straight through to the Swedish Court already mentioned.

Having arrived at the Pavilion and passed its gilded gates, the visitor will ascend to the principal floor by a broad flight of ten steps. As he does so, he will notice upon the walls on either hand the names, in letters of gold, of those by the aid of whose subscriptions the building has been erected and its varied and instructive contents brought together. Turning to the left, the first object to meet the eye is a large statue, 10 feet in height, of Philippe Le Bon—whose name stands out so conspicuously in connection with the introduction of gas lighting—occupying the centre of a spacious well-lighted hall. On either side are apartments decorated in effective styles, and fitted up in different ways to show the applicability of gas as a lighting and heating agent. On the left-hand side, the first room will be arranged as an office; the next as a bedroom; and the next will be ornamented with a beautiful Louis XV. lustre. Then will come a bathroom, with its bath-heater, and a statue of Psyche for lighting; and a workroom, lighted by a Wenham lamp. In the next room will be found a collection of meters and stoves, &c.; and in the succeeding one, lighted by a metal hanging lamp and wall brackets, the visitor will witness the method of using gas for glass blowers' and jewellers' work. Then comes an apartment with some more bath-heaters and other appliances, and the visitor passes out of the main hall into a large room in which heating and lighting apparatus will be shown. Two large gas cooking-stoves, each about 6 ft. 6 in. wide, occupy the space against the end wall; that on the east side (next the electric railway) being devoted to chemical, laboratory, and other apparatus. In this hall an excellent example will be afforded, by means of five lustres, of lighting an area by reflection. Returning to the main hall, the

first apartment on the east side will be another bath-room, containing a handsome chandelier composed of nine burners placed above cut-glass almond-shaped saucers. The fitting up of the next apartment has not yet been determined upon; but the succeeding one will be a dining-room, lighted by a Bengel chandelier in which figures the imitation candle, with the gas-jet for the flame, which was at one time a familiar object in connection with gas lighting. Passing the dining-room, the visitor comes to an apartment fitted up as a kitchen; a large cooking-stove, by Drouet, with a plate-warmer above, being already in position. Ordinary culinary appliances occupy the next apartment; and then the visitor reaches an elegantly-furnished dining-room, lighted by a Henri II. pendant. The last apartment is a drawing-room elaborately furnished in the Louis XVI. style.

Ascending the staircase—on the walls of which will be found framed drawings of M. Chevalet's scrubber and tar condenser, and of his apparatus for making alkali and sulphate of ammonia, as well as two coloured drawings of regenerator settings by MM. Frère et Hovine (one by the latter gentleman showing his system of heating a setting by a furnace located apart therefrom) —the visitor reaches the landing leading to the reception-room and to the galleries over the apartments in the large hall. In going up, he will not fail to notice the two massive brass stair-lamps, with large glass globes cut in the lower and opaque in the upper portion, projecting from the walls at the half landing; nor will the elegant metal-work lamp suspended from the ceiling escape his attention. Passing on to the galleries, he will find on the left-hand side of the building three large windows opening on to balconies, with book-cases between them, and tables and recesses for the exhibition of photographs, &c. In the case between the first and second windows are bound volumes of the Transactions of the Société Technique du Gaz en France and of publications connected with the gas industry. The other case contains various samples of burners. From the centre of the cross gallery, the lecture-hall under the dome of the Pavilion is entered. Here the visitor finds himself in a spacious room, lighted in the daytime by two windows—a large one looking over the Avenue de la Bourdonnais, already mentioned, and the other on to the Exhibition buildings—and at night by a large chandelier and wall lights in brass and crystal. Returning to the hall, and passing along the gallery on the east side, the visitor will find upon the walls photographs of French and other gas-works (sixteen views of those at St. Etienne), and a plan of the gas-mains in Paris as they existed in the year 1843. This plan will doubtless be studied with much interest; and it is to be regretted that no intimation is given of a companion one, showing the present extent of the canalization of the city, being placed upon the walls. As the gas consumption of Paris in 1855 —twelve years after the above-named date—was about 1440 million cubic feet, while last year it was nearly 11,504 millions, the extent to which the subsoil of the streets is now occupied by the Gas Company's pipes, as compared with rather more than half a century ago, would be something astonishing. Exceedingly interesting historical documents will be found on the walls at this part of the gallery. Photographs will be exhibited of Le Bon's house, as seen from the street and from the garden; and they will be accompanied by a biographical notice and a copy of the specification of his patent. Le Bon was born at Brachay, near Joinville (Haute Marne) on May 29, 1767; and it was at about the age of twenty-two that he carried out the experiments which led to the discovery of the method of producing combustible gas from wood. According to a *brochure* published by his nephew—M. Gaudry—Le Bon continued his experiments at the suggestion of Fourcroy, and in the Year VIII. of the Republic he read at the Institute a remarkable paper giving the results of his labours. But it was not until the following year (1799) that he took out his patent, which bore the date of the 28th of September. Murdoch, however, had been using gas for lighting his house in Cornwall—the house which was shown in the "JOURNAL" for the 1st inst.—from 1792. But there appears to be a still earlier claimant than either Murdoch or Le Bon to the honour of the discovery of coal gas—one Minckelers, a Dutchman, in 1784. The text of the document in which he sets forth his claims will be shown in its original language accompanied by a translation in French.

We have lingered in the gallery of the Pavilion, and must now descend to the basement, the floor of which is a few feet below the ground level. It is reached from the landing facing the entrance to the building, as well as by a staircase at the end of the group of apartments on the east side of the large hall. Various will be the appliances shown here. Commencing on the left-hand side, two conspicuous objects will be a big meter and the Paris Gas Company's large tyre-heater. The apparatus used in the application of gas to pottery work and to other industrial operations, including confectionery making, are next seen. Then come meters, pressure-registers, &c., by the Companies with which the names of MM. Thiercelin, Chamon, and Brunt are associated; and M. Chevalet's washer, condenser, and scrubber are on view here. At the end of the basement is the door leading to the dark-room in which photometrical observations will be conducted. On the east side of the basement, the visitor will be able to inspect the apparatus for the production of aërogen gas, and witness the application of coal gas as a motive power. Machines for ironing, printing, and burning off yarns are located here; also gas-engines by Niel, Charon, Dehaître, Panhard, Fritscher, Nouvelet, and by the Paris Gas Company, as well as one of the Otto type.

In taking leave of the Gas Pavilion, it only remains to say that the Executive Committee have secured the co-operation of upwards of thirty French firms in making the collection of exhibits shown therein as thoroughly representative as possible. Only a general indication of their character can be given at the existing stage of the arrangements; but for the particulars we are now able to present we are indebted to the courtesy of M. Leclerc, the Engineer of the Compagnie Centrale, who has been very zealous in his endeavours to make the historical part of the collective exhibit as complete as practicable. Unfortunately, England has not responded so promptly as could have been desired in support of the claims of Murdoch as the inventor of gas lighting. Space would, however, readily be found for any photographs, prints, or copies of documents, specifications, &c., bearing upon the early history of gas lighting.

We now come to another matter in which gas engineers will certainly be interested—the lighting of the Exhibition. This, in the main, is done by electricity; and such is the prominence given to this illuminant, that a Palace has been specially devoted to it. Not only is electricity employed for lighting, but it is also used for motive power; the current being generated at a central station in the Exhibition, and conveyed to the spot where it is required. Unfortunately, much difficulty has been experienced in getting the heavy exhibits into position; and consequently some of the machinery which is to generate current is not yet in operation. Sufficient is at work, however, for lighting restaurants, promenades, &c. The arc and incandescent systems are both extensively employed. The great show-piece of electric lighting is, very appropriately, the *façade* of the Palace of Electricity, in front of which stands the Château d'Eau, or water cascade, which, so to speak, forms its lower portion. The roof takes the form of an immense arc of a trefoil circle, formed by the junction of several smaller arcs, and it rises to a central point at a height of 230 feet. Here is an allegorical figure representing Electricity standing in her chariot brandishing the torch of Progress, and having behind her a great glass sun which, when lighted up, sends forth brilliant rays. This beautiful piece of work, which is called by many the *clou* of the Exhibition, is illuminated by something like 5000 incandescent electric lamps, eight arc lamps with projectors of various coloured glasses, and four similar lamps furnished with reflectors. When these are all in operation, the spectacle presented is certainly unique. Unfortunately, a fire broke out in the Château d'Eau last Tuesday, which, although rapidly and without difficulty extinguished, so damaged the switch-board connections as to seriously interfere with their use for a few weeks. Some effective electric lighting by incandescent lamps is to be found in the vicinity of the Eiffel Tower; and this structure itself has its outlines illuminated on Sundays. A pretty piece of lighting, though somewhat of a theatrical character, is to be seen at the Luminous Palace, constructed entirely of glass, and lighted by incandescent electric lamps. Close by, the Costume Palace and its restaurant will not fail to attract notice for their lighting arrangements. On the other side of the Tower is the Optical Palace, the restaurant attached to which is highly effectively lighted. These are the most striking features of the electric lighting arrangements as far as they have been carried out; and the accident above alluded to will cause further delay in their completion. This backwardness—the exhibition having been open more than five weeks—is much to be regretted; and it is giving rise to complaint. To make matters worse, the current which can be generated is not, it appears, always to be relied upon; for a few evenings ago the restaurant just referred to had to close on account of failure of the supply.

We have left till the last a description of the lighting of the Parks of the Champ de Mars by the Paris Gas Company. Reference has been already made in the "JOURNAL" to this very striking piece of work, which has been carried out by the Company in conjunction with the French Incandescent Gas Company and the Denayrouze Company. The gas is supplied at ordinary as well as at high pressure (8 inches); the compressing-station being close to the Optical Palace above referred to. The area covered extends from the Palace of the Trocadéro, on the right (or north) bank of the Seine, to the Château d'Eau already mentioned, with the exception of the bridge by which the river is crossed. This is a distance, according to the official plan of the Exhibition, of 1166 yards, as the crow flies; and the portion of the area extending from the south of the Tower to the Château d'Eau is from 165 to 175 yards wide. In the neighbourhood of the Trocadéro, the lamps extend into the side walks. The entire area allotted to the Companies is lighted by 4750 burners —3000 supplied by the Incandescent Gas Company and the remainder by the Denayrouze Company. The first-named Company have 260 lanterns, each fitted with a single burner consuming 10·6 cubic feet of gas per hour; 430 with three burners, each passing 8·8 cubic feet; and 40 with five burners, each consuming a like quantity. All these burners are supplied at the ordinary pressure. Those served with compressed gas are as follows: 90 lamps with two burners, 20 with three burners, 20 with five burners, and 60 with ten burners—all consuming 12·3 cubic feet of gas per hour. The total light yielded by the entire quantity of gas consumed with this Company's burners is estimated at nearly 620,000 candles. The Denayrouze Company have gas supplied at normal pressure to 180 lamps, each fitted with one burner consuming 10·6 cubic feet per hour, and to 360 lamps

with three burners passing 8·8 cubic feet each. High-pressure gas is supplied to 60 lamps with two burners, to 15 with three burners, and to 30 with ten burners—all consuming 12·3 cubic feet each per hour. The total light yielded by this Company's installation is estimated at 285,000 candles—making altogether 905,000 candles; the consumption of gas being about 60,000 cubic feet per hour. The columns employed appear to have been specially designed for the Exhibition. Some are of the ordinary height, and have the usual type of Paris lantern, while others are much taller, and carry globular lamps with the upper portion fitted with reflectors. Though the effect of this unexampled piece of illumination may be very well appreciated from the ground level, the plan adopted for the distribution of the brilliant light-centres will be best made out from the first stage of the Eiffel Tower; and an ascent thus high may be recommended. Apart from the foregoing scheme, incandescent gas lighting is to be seen at several of the restaurants; and lines of ordinary gas-jets are employed for marking the upper portions of the buildings on either side of the Champ de Mars. It will thus be seen that, notwithstanding the prominence given to electricity at the Exhibition, opportunity has been found for showing that gas is still capable of holding its own as an illuminant; and, moreover, it was ready to time and has never failed.

PREDICTIONS—GENERAL AND GASEOUS.

It has not unfrequently been a subject of reflection with us whether the prophets of old were really endowed with some supernatural power of forecasting the future, or whether they were merely men possessing more than ordinary clearness of insight into present things, which enabled them to predict what might happen in the time to come. However this may be, it is certain that persons have lived whose predictions have been verified in a remarkable manner. In connection with this subject, the mind reverts at once to the prophetic couplets of the personage popularly known as Mother Shipton, who in the time of Henry the Eighth foretold the deaths of Wolsey, Lord Percy, and others, and threw out some remarkable indications of the possession of a capacity to look into the future. If the prophecy attributed to her that "the end of the world would come in eighteen hundred and eighty-one," is not a forgery, as it is generally believed to be, she was certainly very much out in her reckoning. But her statement that people would one day travel upon the housetops and ride in horseless carriages has been verified by the appearance of the overhead railways and motor cars of our own times. And speaking of travel, we recall a passage in which Wordsworth seemed to have a prevision of the "scorcher" of the present day, flying through the country with his eyes steadfastly fixed upon the ground, bent upon making a "record" ride rather than benefiting by contemplation of the beauties of Nature so dear to the heart of the Lake Poet. A few months ago, attention was called by Mr. Hermann Vezin, in the columns of "The Times," to a remarkable prediction in regard to the Suez Canal. The formal commencement of that great work, which now plays so important a part in commerce and politics, was made by M. de Lesseps turning a spadeful of sand at Port Said rather more than forty years since—to be exact, on Nov. 17, 1859; and yet the idea of having such a canal was put forward more than 300 years ago by Christopher (more familiarly known as Kit) Marlowe, the well-known English dramatist and poet, who lived between 1564 and 1593. Before he had reached the age of twenty-three, he wrote a tragedy entitled "Tamburlaine the Great." It was divided into two parts, in the second of which will be found (Act V., sc. 3) these lines:

> "And here, not far from Alexandria,
> Whereas the Terrene and the Red Sea meet,
> Being distant less than full a hundred leagues,
> *I meant to cut a channel to them both,*
> *That men might quickly sail to India.*"

But it is to two predictions with reference to the industry with which the "Journal" is identified, rather than to those mentioned above, that we wish to call our readers' attention. In the course of an interesting article which appeared in the "Evening Standard" last week on "The Lights of London," the writer told a story about Dr. Johnson which we shall venture to repeat, because we do not think it is generally known—at all events, we do not recollect having met with it in "Boswell" or anywhere else—and, further, because the remark attributed to the great lexicographer was made within a few yards of the "Journal" office. It may be stated, by way of preliminary, that in 1684 the first public street-lamps burning oil with cotton wicks were introduced by an inventor named Heming. They were made with thick convex glasses on two or three sides, and threw out rays of light where required for the illumination of the footpaths. This system of lighting was improved and extended from time to time, and reached its highest stage of efficiency from 1744 to 1750. In 1786, a foreign writer described the lamps of London as being "all of crystal glass, each furnished with three wicks, and affixed to posts placed at the distance of a certain number of paces from each other." Oxford Street was reported to contain "more lamps than all Paris;" and they were said to have "a beautiful and noble effect." It was one of these lamps which evoked the remark recorded in the following extract from the article in our contemporary:—

> It is said that as Dr. Johnson was one evening leaning out of the window of his house in Bolt Court, he observed the parish lamplighter nimbly ascend a ladder for the purpose of lighting one of these street-lamps. The man had scarcely descended the ladder half way when he discovered that the flame had expired. Quickly returning, he lifted the cover partially, and, on his thrusting the end of his torch beneath it, the flame was instantly communicated to the wick by the thick vapour that issued from it. "Ah!" exclaimed the Doctor, much interested; "one of these days the streets of London will be lighted by smoke.

The "smoke" referred to by the Doctor was not, as the writer points out, long in coming; for Murdoch lighted his little house at Redruth with gas in 1792. Out of "smoke" he had succeeded in bringing forth "light." Another utterance which partook very much of the nature of a prediction is attributed to the French chemist Le Bon, who a few years later produced gas from wood, which material he subsequently replaced by coal. In a *brochure* which he published, he indicated how his gas could be distributed by means of pipes to the inhabitants of towns; and he pointed to a time when, by its aid, light and heat would be supplied from Brachay (his native village) to Paris.

THE HOUSING QUESTION AND MUNICIPALISM.

Some of the many unforeseen—or, if pointed out by the prudent, by the ardent Progressive disregarded—results of municipal enterprise were given prominence to in a recent issue of "The Times" in an article dealing with the Socialist and Labour conference held a week or so since at Glasgow. At that conference, much was said of the work that has been done by the Municipality of that city, some account of which was given in the "Journal" at the beginning of the year (*ante*, p. 23), in a review of Sir David Richmond's notes on the progress of Glasgow during the term of his office as Lord Provost. Especially was attention called at the labour conference to the work that has been done in Glasgow in providing houses for the working classes. One of the speakers remarked that, compared with the Glasgow lodging houses, those lately erected in West Ham are "mere mousetraps." This heroic policy for dealing with an admittedly difficult and pressing problem in our large cities has not been attended by unqualified success; it has, indeed, tended to create fresh problems.

First, we are told that in Glasgow, as elsewhere, the people for whom the houses were built do not always avail themselves of the opportunities for decent living so provided. "Even a munificent corporation must exact some rent; and a moderate charge for excellent rooms is too much for some of those who will put up with overcrowding, dirt, noise, and every inconvenience, provided the rent be small and irregularly paid." Then, it is said, the attractiveness and comparative cheapness of the municipal lodging houses is having the effect of drawing to Glasgow more and more of the poorer sections of the country districts. The over-crowding will, if that be the case, remain and flourish side by side with the Corporation debt, which is already not far short of 8 millions. Again, it is not certain that the experiment is even a paying one. "On the lodging houses of the city it is alleged that a dividend of 5 per cent. is earned; but the Corporation 'family home' has not yet proved a success, involving as it does to the town a loss of some hundreds a year." Knowing what we do of municipal book-keeping, we should not be too sure about that 5 per cent.

Moreover, as the writer in "The Times" remarks, we hear of and see chiefly the good effects of such experiments. The reverse of the coin is only seen later. "We hear praise of the comforts of the lodging houses built by pledging the rates. What are not seen are the ultimate and indirect effects on the ratepayers and the recipients of this bounty. . . . Let it be understood that every Municipality is bound to provide lodgings on easy terms, and work at fair wages; and the outlook, when work is slack, will be serious." These facts and possibilities should be carefully weighed and considered by all who wish to see the housing question dealt with practically, but who do not wish to make the remedy produce effects worse than the disease.

The programme of the "Municipal Enterprise" party is well defined as being founded on the principle that "whatever a private person may do with his own, that a Municipality should be able to do with what is not exactly its own." That is just the point. The runners of the municipal machine often have no stake of any considerable size in the efficiency and economy of its working. There is no "director's qualification" required of the municipal councillor, who does not necessarily suffer if the ratepayers'—as a director does if the shareholders'—money be wasted. It is also pointed out, with much force, that there is wide scope for municipal enterprise within its own true sphere, opportunities for municipal energy which from their prosaic and unpretentious character—affording no field for opening ceremonies and self-glorifications—are often neglected for the more showy and "popular" undertakings. "The best sanitary engineers and authorities on hygiene could point to a score of directions in which the most enlightened Municipalities might labour to the great improvement of the health of the inhabitants. Picture galleries and stately municipal buildings and libraries have their place; but a low death-rate, and a general improvement in vitality, are better still. Luxuries by all means in time; but let us first have the necessities of municipal life." That, however, is much too humdrum a programme for the Municipal Progressive.

STOCK CONVERSIONS AND STAMP DUTIES.

THE judgment of the Court of Queen's Bench on the 9th inst., in the case of *The Attorney-General v. The Midland Railway Company*, is of considerable importance to all Companies contemplating a conversion of their capital, and also of those who have carried out that operation since 1891. By an Act passed in August, 1897, the Midland Railway Company were authorized to consolidate certain of their 4 per cent. preference stocks into new 2½ per cent. stock; the old stockholders receiving such a larger nominal amount of new stock as would yield the same annual return as their holdings of the old stock. The Company were also authorized to nominally double their ordinary stock. The result of these operations was to add some sixty odd millions to the nominal capital of the Company; and the Commissioners of Inland Revenue claimed that this increment was subject, under section 113 of the Stamp Act, 1891, to a duty of 2s. per cent. The Company resisted the claim; but, by the judgment referred to, the Court have upheld the contention of the Inland Revenue. Should this judgment be confirmed in the Higher Courts, to which it will doubtless be carried, the Railway Company will have to pay rather more than £60,000 duty as the cost of their stock conversion.

The section of the Stamp Act in point requires that, "in the case of any increase of the amount of the nominal capital of any Corporation or Company," a statement of such increase shall be delivered to the Commissioners of Inland Revenue, and the duty paid thereon; and the Court of Queen's Bench have decided that this provision covers all such stock conversions as that effected by the Midland Railway.

Mr. Justice Ridley, in his judgment (in which Mr. Justice Darling concurred), said that "nominal share capital meant the capital of the Company in shares, computed according to the figure value attached to the shares. An increase of the nominal share value would, therefore, take place if the figures of the shares were altered from, say, £100 to £200; and the increase of share capital so effected would be one in respect of which the additional duty provided for by section 113 would be payable. In his opinion, the alteration in the stock of the Midland Railway authorized by the Act of 1897 did amount to an increase of their nominal share capital; and the duty was payable accordingly."

This judgment appears to bear upon the various conversions effected by Gas Companies at different times since 1891, except in the cases where the authorizing Act has contained an express exemption. It is to be hoped that an appeal will be lodged, and will be successful. Otherwise all conversion schemes will—especially since the duty was, by section 7 of the Finance Act, 1899, increased to 50 per cent.—be costly luxuries.

THE COMPETITION OF AMERICAN WITH BRITISH COAL.

As has been more than once pointed out in these columns, the present exaggerated prices for coal in England and on the Continent afford an opportunity, which could not occur in normal times, for American coalowners to compete with British for the European market. That our 'cute cousin across the water is fully alive to his opportunity, now as always, is shown by the following, which is a copy of a recent circular sent out by the Commercial Department of the United States Government to all its Consuls.

The Department have recently received a number of voluntary reports from Consular Officers at different points in Europe upon the scarcity of coal suitable for manufacturing and steamship purposes; and they call attention to the fact that an opportunity offers for the increased exportation from the United States, not only of bituminous, but also of anthracite coal. Certain grades of our steam coal have been found to compare very favourably with similar coals imported from Great Britain or from mining regions on the continent of Europe. During the calendar year 1899, the export of American coal increased by more than 3 million tons over that of the previous year; and there would seem to be exceptionally favourable conditions—which should be promptly availed of—to largely increase the consumption in foreign markets. You are therefore directed to report, with as little delay as possible, upon the demand in your district for imported coal, the total consumption of coal, the kinds and qualities which are especially needed, the prices they command, and the sources from which the present coal supply is obtained. If American coal is already being used, please indicate to what extent, the origin and character of the coal, and whether it is satisfactorily supplying the place of coals previously used. Should there be coal mines in your district which supply the local demand, please state the fact; also whether coal is exported, and to what extent, and the causes and probable duration of scarcity of supply, if such scarcity exists. It is important, if objections exist to American coals, that the reasons be stated; also what tariff or other restrictions upon importations are imposed, and the character of transportation facilities from points in this country, foreign rates, &c.

Some weeks since we informed our readers that American coal had been shipped to Europe; and this fact is referred to by Mr. Vice-Consul Carmichael in his recent report upon the trade of Leghorn. He says:

The coal famine which set in last November has had the effect of attracting American coal to this market. The high price which British coal has now attained more than made up for the handicap in freight with which American exporters have hitherto had to contend. It is probable, however, that the quantity imported would have been considerably larger had the consumers here not been somewhat chary of buying a new kind of coal, of the qualities of which they knew nothing, especially as at first the difference in price as compared with British coal was slight. At present, however, American coal is about 12s. a ton cheaper f.o.b., while the freight from the United States to Leghorn is about 4s. above that from the United Kingdom; thus leaving American coal a margin of about 8s. a ton. Of course, when the British market regains its normal condition, United States coal will again be at a disadvantage, unless favoured by an exceptional condition of the American freight market. But having once gained a footing, it is conceivable that it may continue to be imported by liners which may prefer to fill up with coal at an exceptionally low rate to returning to the Mediterranean with incomplete cargoes, as sometimes happens.

Whether the possibility referred to by Mr. Carmichael in his concluding remarks becomes a fact or not, it is beyond doubt that every ton of American coal now unloaded in Europe must tend to bring about the all-desirable return of home markets to the level of reasonable prices.

PERSONAL.

Mr. SIDNEY E. STEVENSON, who has relinquished the position of Manager of the Cape Town and District Gas Company, will sail for England on the 31st inst. He is succeeded by Mr. E. P. REILLY, lately of Guildford.

Mr. WILLIAM J. HOLLINGSWORTH, Assoc.M.Inst.C.E., has been appointed London Manager of Messrs. Crossley Bros., Limited, in succession to the late Mr. Tom Hay Wilson, whose death is noticed in our "Obituary." Mr. Hollingsworth has been with the firm during the past eight years.

The Plymouth Town Council accepted last week the resignation of Mr. E. SANDEMAN, the Water Engineer, and confirmed a resolution of the Water Committee, congratulating him upon his appointment as Engineer to the Derwent Valley water scheme, and expressing appreciation of his services to the town during the time he has filled his present position.

The Council of the Society of Arts recently attended at Marlborough House, when His Royal Highness the Prince of Wales, K.G., President of the Society, presented the Albert medal to Sir WILLIAM CROOKES, F.R.S., "for his extensive and laborious researches in chemistry and in physics—researches which have, in many instances, developed into useful practical applications in the arts and manufactures."

OBITUARY.

Mr. J. BOWMAN, who was for thirty years Manager of the Huntly Gas Company, and who was twice Chief Magistrate of the burgh, died at his residence there last Wednesday. Mr. Bowman retired from business some years ago on account of ill-health.

Mr. EDWARD PRITCHARD, M.Inst.C.E., died last Friday week, as the result of an apoplectic fit. As an engineer, he had had a varied experience. It is worthy of note at this particular time that he was the designer of the Pretoria Water-Works; and the Warwick Water-Works were also constructed from his plans. He has taken a large part in the projection of electric tramway schemes. Mr. Pritchard, who was head of the firm of Messrs. Pritchard and Co., of Birmingham, was 62 years old.

With ourselves, a large number of readers will regret to learn of the death of Mr. TOM HAY WILSON, the London Manager of Messrs. Crossley Bros., Limited. Mr. Wilson had been ill for something like six weeks; but he expired suddenly on Thursday, the 10th inst.—death being due to an apoplectic stroke. The deceased gentleman commenced his engineering career with the firm of Robert Stephenson and Co., of Newcastle-on-Tyne; and he had been connected with Messrs. Crossley Bros. for twenty years, which is about the period that the London house has been established. He was for several years the assistant to the previous Manager, Mr. Robert Wilson (no relation), who is now a Director of the firm. The late Mr. Wilson, who was 60 years of age on the 4th inst., had been Manager for rather more than three years.

At the recent meeting of the Iron and Steel Institute, Mr. A. Greiner gave an account of the results obtained at the Cockerill Works, Belgium, with the first blowing-engine worked by blast-furnace gas ever employed in iron-works. This 600-horse power engine has been running since Nov. 20 last with unpurified gas taken from the Seraing blast-furnaces.

The United States Congress has under consideration a Bill for the conversion of the present Office of Standard Weights and Measures into a National Standardizing Bureau similar to the Reichsanstalt at Charlottenburg and the National Physical Laboratory. The clause dealing with the work of the bureau reads as follows: "The functions of the bureau shall consist in the custody of the standards; the comparison of the standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government; the construction when necessary of standards, their multiples and subdivisions; the testing and calibration of standard measuring apparatus; the solution of problems which arise in connection with standards; the determination of physical constants, and the properties of materials, when such data are of great importance to scientific or manufacturing interests, and are not to be obtained of sufficient accuracy elsewhere."

TECHNICAL RECORD.

THE INCANDESCENT GAS-MANTLE AND ITS USE.

By VIVIAN B. LEWES, F.I.C., F.C.S.,

Chief Superintending Gas Examiner to the Corporation of London, Professor of Chemistry at the Royal Naval College, Greenwich.

[The Second of a Course of Three Cantor Lectures at the Society of Arts delivered May 14, 1900.]

In the last lecture, an attempt was made to trace the inception and growth of the incandescent mantle as it exists to-day; and it will be well to now tabulate the oxides which have been used in the manufacture of mantles, and see the amount of light emitted by each under the conditions existing in the mantles.

Light Emitted by Various Oxides.

Oxide.	Pure.	Commercial.
Metals—		
Zirconia	1·5	3·1
Thoria	0·5	6·0
Earth Metals—		
Cerite earths.		
Ceria	0·4	0·9
Lanthana		6·0
Ytterite earths.		
Yttria		5·2
Erbia	0·6	1·7
Common earths.		
Chromium oxide	0·4	0·4
Alumina	0·6	0·6
Alkaline Earth Metals—		
Baryta	3·3	3·3
Strontia	5·2	5·5
Magnesia	5·0	5·0

In utilizing these oxides for the manufacture of mantles, it is evident that there are many points besides the power of emitting light which must be taken into consideration.

Some salts shrink so much during the conversion by burning into oxides, that a mantle of very considerable initial size would have to be taken in order to get a skeleton of oxide of sufficient dimensions to fit the flame. Other oxides which promise well as far as their shrinkage during formation goes, are found to slowly volatilize under the influence of the bunsen flame; so that in the zone of most intense heating, the thread of oxide gets thinner and thinner and gradually disappears. Other oxides, again, are brought too near to their point of fusion, and soften to such an extent that the mantle shrinks in where most heated, and gets inside the zone of greatest heat—giving rise to a considerable loss of light; while other oxides, like yttria, give so distinctly coloured a light as to be objectionable. Careful testing, both as regards duration and strength, leads one to the conclusion that, of the oxides given, thoria, zirconia, and alumina alone can be used for forming the structure of the mantle. Alumina, however, has the drawback that the mantle is very hard, and not easily shaped in the blowpipe flame, shrinks in the zone of greatest heat, and slowly volatilizes; while zirconia mantles are liable to considerable and rapid shrinkage. So that thoria practically stands alone as the ideal basis for a mantle. It is easily shaped in the blowpipe flame, gives a comparatively small shrinkage when the fabric containing the nitrate is being converted into oxide, and, when formed, the mantle resists the action of temperature for a longer period than any other known oxide.

Perhaps the most important property is the enormous increase which takes place when thorium nitrate is converted into oxide, as if a comparatively small mass of nitrate be heated on platinum foil, it swells up in much the same way that the sulphocyanide of mercury constituting the old "Pharaoh's Serpent" does; and the small bulk of nitrate becomes an enormously larger mass of thorium oxide. So that, although in the mantles as now used there is 1 per cent. of ceria by weight, the proportion by volume is less than 0·1 per cent. Having got the basis of thoria, it is seen that in its pure condition it only emits about half-a-candle of light per cubic foot of gas consumed. The difference, however, between the lighting power of the pure thoria and the commercial at once indicates how sensitive it is to the exciting influence of small traces of impurities; and when mixed with 1 to 2 per cent. of ceria, it acquires a power of light-emissivity, combined with durability, which is unequalled by any other known mixture of the available oxides.

Many attempts have been made to explain in a satisfactory manner the marvellous power which the minute trace of ceria has of awakening to life the light-giving power of the mantle. In order that the mantle may emit its full measure of luminosity, it has to be heated in the extreme fringe of the outer zone of the bunsen flame; and here it is that the combinations take place between the products of incomplete combustion and the oxygen of the air. Such theories as credit the power which the mantle has of emitting light, as being due to any special action that the ceria may have in converting heat rays into light rays (which was the one put forward by Dr. Drossbach), are at the present time discarded in favour of the theory that both the air and gas are taking part in the actions which induce the luminosity.

Drs. Killing and Moschelles are of opinion that the ceria particles on the surface of the mantle are heated to a higher temperature than is the surrounding material, owing to the cerium being a metal which forms two oxides—the lower cerous oxide (Ce_2O_3), and the higher, or ceric oxide (CeO_2); and that at a high temperature, under the reducing action of the hydrogen and carbon monoxide, the ceric oxide becomes reduced to cerous oxide with the liberation of oxygen, which, combining on the surface of the ceria with the combustible gases in the burner, induces a far higher temperature in the ceria particles than exists in the thoria, and they suppose that the cerous oxide so formed again undergoes oxidation to the higher compound by the action of the excess of air present.

It is hard, however, to accept this theory in view of the extremely narrow range over which ceria acts as a useful excitant of the thoria basis. One would expect that, if the theory were the true one, the more ceria that was present the more particles would be heated to high incandescence; and increase in the quantity of ceria would increase rather than reduce the power of light emissivity.

The second theory—and the one now most generally accepted—is that propounded by Dr. Bunte, who ascribes the high illuminating effect produced by the trace of ceria as being due to a catalytic action of the same character as causes a piece of platinum foil, which has been heated in order to cleanse its surface, to become red hot when a current of mixed coal gas and air is allowed to impinge upon it; the action here being due to the power which platinum possesses of compressing both coal gas and air upon the surface, and rendering them so chemically active that they combine on the surface of the metal and emit sufficient heat to raise the mass to a bright red.

Dr. Bunte made a number of experiments as to the influence of thoria and ceria in bringing about the combination of hydrogen and oxygen. He found that at 1200° Fahr. (649° C.) a mixture of hydrogen and oxygen, in the ratio of 2 to 1, when passed through a heated porcelain tube, combined to form water; and that the presence of thoria in the tube had no effect in lowering the temperature at which this action took place. When, however, the oxygen and hydrogen were passed though a tube containing ceria, the action commenced at 600° Fahr. (315·5° C.); and he concludes that this catalytic action, localizing a high temperature in the small particles of ceria spread over the surface of the large mass of inert thoria, is the cause of the high light emissivity.

Had Drossbach been right in ascribing the light of the mantle to any peculiar light emissivity on the part of the oxides, proof of this ought easily to have been obtained by the way in which the rare oxides and mixtures behaved when heated out of contact with air; and Dr. Bunte found that, on trying this experiment, there was a very small difference in the noticeable light radiation from bodies of such widely different light emissivity as carbon, magnesia, thoria, or the mixtures used in the Welsbach mantle.

In order to prove this, Bunte took a thick-walled tube of retort-carbon, the walls of the middle portion of which were reduced to a thickness of 0·059 inch for a length of about 4 inches; and on passing a strong current of electricity through the retort-carbon cylinder the resistance of the thin-walled portion caused it to be heated up to whiteness—the temperature attained being estimated by him at over 3630° Fahr. (1999° C). The tube was prevented from burning away at this highly heated point by being coated with magnesia, over which an outer wrapper of asbestos paper was pressed; and in the interior of this tube small square prisms of magnesia were placed, coated with the substances to be examined—each prism being compared side by side in the hottest portion of the tube, and the conditions existing being observed through a small sight-hole at the end of the carbon tube.

By using double prisms, one of which was coated with the substance to be tested and the other with a standard substance of known composition, it was found that practically little or no difference existed between the various materials tested. This point was also confirmed by some very interesting experiments made by Mr. Swinton, in which he enclosed various mantle materials in a vacuum tube and submitted them to cathode rays, by which a very high temperature can be obtained, capable of raising finely divided carbon to incandescence and fusing platinum into glass. Using mantles made up of small squares of ceria and thoria alone, and mixed in varying proportions, he found that, although the mixture of 99 per cent. of thoria and 1 per cent. of ceria in a vacuum heated up to incandescence more rapidly than pure thoria alone, and on stopping the discharge cooled down more rapidly, its incandescence was only very slightly greater than that of the thoria alone. Both these experiments clearly show that the idea of the Welsbach mantle having any peculiar power of converting heat rays into light must be discarded; otherwise the same differences would have been noted when the materials were heated out of contact with air as when heated in the presence of air.

There are also many facts which tend to support the theory that the light is due to the particles of the oxide of ceria being heated to a higher temperature than that of the flame. My own researches on the cause of the luminosity of flame point to the splitting up of the molecule of acetylene, with the liberation of the endothermic heat contained in it, as endowing the carbon particles with a temperature far above that which exists in the flame; so that the temperature of incandescence in the hydrocarbon flame is due to the heat of the combustion *plus* the local endothermic heat of the decomposition. In the same way in the

mantle, it is probably the heat of the flame which heats the whole of the mantle *plus* the locally intensified points of excessively high temperature due to the catalytic action of the ceria on the mixture of oxygen, carbon monoxide, and hydrogen that gives the intense power of light emissivity that the mantle possesses; the theory being made more probable by the fact that other substances known to have catalytic powers when used in sufficiently small traces give similar, although not such marked, results.

An objection to this theory may be raised from the fact that the amount of ceria is so minute that it does not seem possible that it should play any important part in the light-giving power of the mantle. Dr. Bunte, however, overcomes this by pointing out that in an ordinary gas-flame the luminosity is due to the liberated carbon particles being heated to an intense degree. This carbon is obtained chiefly from the decomposition of unsaturated hydrocarbons, which together only form about 5 per cent. of the volume of the gas. Supposing that all the carbon of the unsaturated hydrocarbons be liberated and heated to incandescence, it may be calculated that about 54 milligrammes of carbon are separated from 1 litre of coal gas, or 23·6 grains from 1 cubic foot. Thus 4 per cent of ethylene and 1 per cent. of benzene give per litre of gas 60 cc. of carbon vapour from the benzene, and 40 cc. from the ethylene—in all 100 cc., which is equal to about 54 milligrammes of carbon. The volume of the luminous portion of a flame having a consumption of 5·297 cubic feet per hour and an illuminating power of 17·5 candles, is about 2 cc. at 32° Fahr. (0° C.). It therefore contains $2 \times 54 \div 1000$ milligrammes, or 0·1 milligramme (0·0015 grain) of incandescent carbon; and this small quantity of 0·0015 grain of incandescent carbon is sufficient to yield a light of 17·5 candles. In a Welsbach mantle, the amount of ceria is about 4 milligrammes, 0·06 grain, or forty times the quantity of the incandescent carbon in an ordinary flat-flame, and therefore is quite sufficient to explain why the Welsbach mantle gives a light of 80 candles when the argand burner only affords 16 candles.

The point that always seems a difficulty to me in this theory is that, if it be the true one, the only explanation of 1 per cent. of ceria being the amount that gives the maximum of light emissivity would be that in the outer envelope of the flame there was just sufficient unburnt combustible gas for this amount to act upon by its catalytic power, and that an increase of the combustible gas at this point should enable one to increase the amount of ceria present. But, so far, I know of no confirmation of this; nor does the minute trace of ceria have the same exciting effect upon a zirconia or alumina basis. We have probably much more to learn as to the true action of the trace of ceria in exciting the light emissivity of the thoria mantle; and it must be borne in mind that thorium itself has some strange, and at present unexplained, action towards light, which enables it to act in the same way as radium on a sensitive plate in the dark.

The actions which lead to the emission of light in the Sunlight mantle are of the same character as those taking place in the thoria-ceria mantle. The basis is alumina, which itself has no power of emitting light, but which is endowed with that power by the addition of chromic acid, which, when itself made into a mantle, is also void of any practical illuminating emissivity. Chromium, like cerium, forms two oxides; so that the theory of Killing and Moschelles would also apply to its light-emitting power. The light given by such a mantle is entirely dependent upon the proportion of the oxides of chromium present; and while with a small percentage only, and using a dilute solution of the alumina salt, it is possible to obtain a nearly white light, an increase in the strength of the solution and the percentage of chromium oxides gives a reddish yellow light.

It is impossible, however, in practice, to use a solution for saturating the cottons sufficiently dilute to give anything approaching a white light. If this is done, though the mantle will give a good light of about 14 to 15 candles per cubic foot of gas, the mantle shrinks so rapidly that in a comparatively short space of time it gets out of the zone of greatest intensity, and only emits a very feeble light; while if the percentage of chromium is increased, the light emitted is not so high—rarely exceeding 11 candles per cubic foot of gas—but the mantle lasts fairly well for 300 or 400 hours.

Analyses of the "Pink Sunlight Mantles" show them to be composed of—

Alumina	86·88
Chromium oxides	8·68
Zirconia	4·44
	100·00

The zirconia being added to give greater strength to certain parts of the mantle.

In these mantles, the alumina, if used alone, would volatilize slowly at the heat of the bunsen flame; so that in the zone of greatest intensity the threads rapidly become thinner and thinner until they finally disappear—this point being arrived at before the mantle has been in use 100 hours. The alumina, moreover, is near its fusion point, and is softened and rapidly shrinks. The oxides of chromium also slowly evaporate when continuously heated; so that the materials do not give much promise in making a good mantle. But when mixed together, or when the alumina mantle is sprayed with a dilute chromium solution, a far more stable compound is formed, of a pink colour, which probably dissociates slowly when heated for a long period, yielding a continuous supply of traces of oxides of chromium, which are the real source of the luminosity, and which gradually burn off.

If instead of an alumina basis a pure thoria mantle be sprayed with the chromium solution, it becomes endowed with a certain degree of luminosity. But this rapidly falls away; there being nothing to prevent the volatilization of the chromium oxides. The property which the chromium has of increasing the illuminating power and prolonging the life of such basic bodies as it can unite with, is well shown in the case of the Fahnehjelm comb. This was originally made of magnesia rods, and lasted barely 100 hours, so rapidly did the magnesia volatilize. When, however, the idea arose of dipping the magnesia rods into a solution of chromic acid, it was found that, not only was the power of emitting light nearly doubled, but that the life of the comb was increased threefold.

Many attempts have been made to improve upon, or alter, the composition of the 99 per cent. thoria and 1 per cent. ceria mantle, by mixing such bodies as zirconia with the thoria. But it is nearly always found that any attempts in this direction tend to make the mantle far more susceptible to shrinkage; while if the foreign body so introduced is present in sufficient quantity to give any practical economy on the thoria saved, the light is at once affected.

Dr. Ernst Hintz, of Wiesbaden, whose researches on the composition of incandescent mantles and the influence of various factors on their light-emitting power are perhaps the most complete ever made, found that quantities of neodidymia, lanthana, and yttria up to 2 per cent. have no influence on the light emitted by a mantle the remainder of which consists of thoria and ceria in the ratio of 99 to 1; that 2 per cent. of zirconia just began to affect the mantle; and that larger quantities of any of these bodies had a detrimental effect upon the light. His experiments and researches are of especial interest, as they show fairly conclusively the inception of the present mantle from the compositions mentioned in the 1886 (or thoria) patent.

The two minerals available for the preparation of thorium salts at the time of this patent—and, indeed, up to about 1892—were thorite and orangite, found in Norway, which are crude hydrated silicates of thorium containing from 50 to 72 per cent. of thoria together with traces of several other oxides of the rare metals, including ceria; and from these the liquid to impregnate the mantles was made without any special precautions being taken to eliminate the traces of the other rare earths—the mantles made from this fluid being looked upon as consisting of pure thoria. Dr. Hintz and others, however, found that, by employing the same methods of separation as were used for the manufacture, the composition of the oxides made from the fluids obtained from the minerals was—

	Thorite.		Orangite.
Thoria	96·606	..	92·416
Ceria	0·994	..	3·162
Neodidymia and lanthana	1·205	..	3·227
Yttria	1·195	..	1·195

These compositions agree very closely with analyses made of mantles sold during 1891-92, and which yielded an illuminating power of the same value as mantles made from liquids of this composition.

Monazite, which is the source from which the thoria now used is obtained, is mainly composed of phosphate of cerium and lanthanum, together with the phosphates of other rare earths, among which is thorium in quantities varying from a little over 1 to 16 per cent., and traces of many other bodies. This mineral, which used to be considered extremely rare, has now been found to be very widely distributed; its chief sources being the United States, Brazil, Siberia, Canada, &c., where it is found in the form of sand produced by the disintegration of primitive rocks.

Ceria being the main constituent of the monazite, and occurring in far larger proportion than the thoria, is separated with a much greater degree of completeness at the present time than was the case with the thoria made from orangite and thorite. Indeed, it was only a few observers who, prior to 1890, had stated that thorite and orangite contained ceria. Small as is the percentage of thoria in monazite, and laborious as is the separation of the thoria from it, the discovery of these large supplies of the mineral has reduced the price of thorium nitrate, according to Dr. Hintz, from £100 per kilo. at the end of 1894 to the present price of about 30s. per kilo.

Of late years, an important variation has been introduced in the manufacture of some mantles, in which, using the mixture of 99 per cent. thoria and 1 per cent. ceria, the principle under which the old Clamond basket was made has been pressed into service. As pointed out in the previous lecture, these baskets were made in the early eighties by weaving together filaments which had been produced by squeezing a paste of magnesia and magnesium acetate through a suitable orifice; and the woven mantle, when baked, could be rendered incandescent by means of an ordinary burner, owing to the threads being reduced to a sufficient degree of fineness.

On November 4, 1890, Lungren took out a patent for an improvement in the method of manufacturing the mantle, which was a great advance on Clamond's original process. In this latter method, it was found that it was a troublesome matter to get a coherent mantle, owing to the threads at the points of intersection not welding properly. The first threads laid on the mould dried before the cross-threads could be put on; so that,

when pressed together, the dried threads cut through the softer ones and did not properly unite with them. In order to overcome this, Lungren mixed his refractory earths into a paste with some combustible elastic material, and from this squeezed out the threads from which the mantle was woven, after which operation the elastic binding material was burnt out. As examples of suitable materials, Lungren instances glue mixed with glycerine, india-rubber dissolved in naphtha, &c., and states that a variety of materials may be used.

At the present day, collodion is rapidly coming to the front as a vehicle for holding the incandescent oxides. This substance has a very interesting history. In 1838, Pelouze discovered that, when paper was treated with the strongest nitric acid, it was rendered exceedingly inflammable; and in 1845, Schonbein, the Swedish Chemist, proposed the use of nitrated cotton wool as a substitute for gunpowder, and showed that its combustion gave no smoke. Several factories were soon at work making guncotton for explosive purposes; but some disastrous accidents taking place, for which no apparent reason could be found, and guncotton being found unfitted for guns, the works were stopped, and until late in the sixties that guncotton was not made on a manufacturing scale as an explosive. Meanwhile, however, it had been found that if the strength of the nitric acid was not kept up, a lower form of guncotton was produced, which was not of much use as an explosive, but which could be dissolved in a mixture of alcohol and ether, and that, when these solvents had evaporated off, a structureless semi-transparent mass was left. Many commercial adaptations were soon found for this material; and its manufacture was started on a large scale.

Among the many other applications of collodion, it has been employed for the manufacture of artificial silk; and large factories have been built in many parts of Europe for this purpose. In one process, wood pulp is converted into collodion by nitration, and this collodion is then dissolved in as little alcohol and ether as possible. In order to obtain the fibre, the thick solution is forced by enormous hydraulic pressure through capillary glass tubes, the bore of which is less than the one-hundredth of a millimetre. Ten to twelve of the expressed fibres are twisted together and wound on to a bobbin; the air of the room being kept sufficiently heated to cause the drying of the filaments a few inches from the orifice of the tube. The compound thread is next denitrated, in order to remove the extreme inflammability which it possesses at this stage; and for this purpose the skeins are dipped in a solution of ammonium sulphide, by which they are converted into ordinary cellulose.

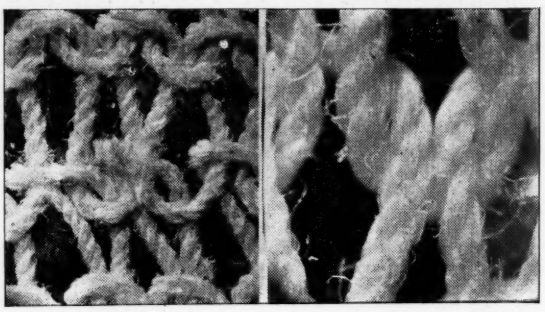
In 1894, De Mare utilized collodion for the manufacture of a mantle, adding the necessary salts to the collodion before squeezing it into thread. Following in his steps, Knofler, in 1895, and later on Plaissetty, took out patents for the manufacture of mantles by a similar process to De Mare's; the difference being that Knofler used ammonium sulphide for the denitration of his fabric, while Plaissetty employed calcium sulphide, the objection to which is the trace of lime left in the material.

Another method of the same kind for making artificial silk, which has considerable reputation, is that known as the Lehner process, which in its broad outlines somewhat resembles the Chardonnet, but differs from it in that the excessively high pressure used in the earlier method is done away with by employing a solution of a more liquid character, and hardening the thread by passing it through certain organic solutions. It is found that this form of silk lends itself perhaps better than the previous solutions to the carrying of the salts forming the incandescent oxides; and mantles made by this process, which we will speak of as Lehner mantles, show promise of being a most important development of De Mare's original idea. Mantles made by such methods as those of De Mare, Knofler, Plaissetty, and Lehner, are clearly developments of the Clamond hood, and not of the Auer mantle. In the Clamond class, the filaments are made by squeezing a homogeneous pasty material through small orifices, so as to form rods or threads; and when the vehicle holding the salts is burnt off, the oxides are left in a thread of even density.

The Auer class consists of excessively minute filaments, many hundreds of which go to form a thread; while each filament, when burnt off, after impregnation with the illuminating solution, leaves a minute rod of the oxides having a dense central portion, which was produced by the salts by capillary attraction being drawn into the small tubes in the centre of the cotton fibre—this dense central portion being surrounded by a more or less spongy coating formed by the salts on the exterior of the fibre being reduced to oxides, and being kept in a broken-up condition by the escape through them of the gases from the burning fabric.

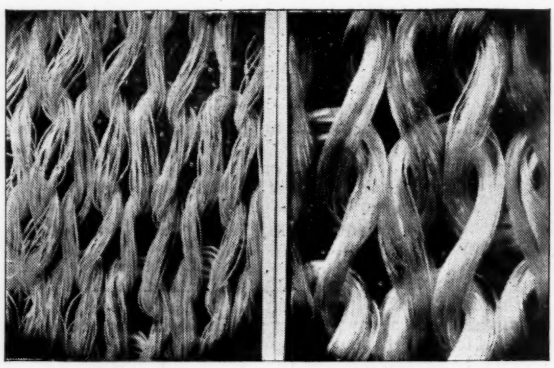
In the Welsbach mantles, this enormous mass of small filamentary matter is twisted in the thread into what, after burning, becomes practically a fluted column of oxides; while in the Clamond class of mantle each separate filament that forms the thread stands out separately by itself, so that what appears to the eye to be one solid filament reveals itself under the microscope as a loose bundle of rods, which vary in number according to the make of the mantle. Those made by the Lehner process have rather more of these separate filaments than those made by the Plaissetty and Knofler methods.

This alteration in physical structure has a most extraordinary effect upon the light-giving life of the mantle, and also upon its strength, as after burning for a few hundred hours the constant bombardment of the mantle by dust particles drawn up by the rush of air in the chimney, causes the formation of silicates on the surface of the mantle, owing to the silica being present in the dust; and this seems to affect the Welsbach structure far more than it does the Clamond type, with the result that, when burnt continuously, the Welsbach mantle falls to so low a pitch of light-emissivity after 500 to 600 hours as to be a mere shadow of its former self—giving not more than one-third of its original light—while the Knofler mantle keeps up its light-emitting power to a much greater extent, and the Lehner fabric is the most remarkable of all. Two Lehner mantles, which have now been burning continuously in my laboratory for over 3000 hours, give at this moment a higher light-emissivity than most of the Welsbachs do in their prime.



Burnt. Unburnt.

WELSBACH "FABRIC" MANTLE.



Burnt. Unburnt.

NEW SUNLIGHT "FILAMENT" MANTLE.

I am in hopes that I have been able to trace the causes which lead to this extraordinary result, and trust at an early date to be able to give the exact reasons that determine this phenomenon. In any case, it may be stated that the trouble with regard to the length of useful light-emission is practically solved, and that the new developments of the Clamond process form as important a step in the history of incandescent gas lighting as the discoveries which gave rise to the original mantles.

The Coal Production of the United States in 1899.—According to the returns representing between 80 and 90 per cent. of the total tonnage, the production of coal in the United States in 1899 is estimated by Mr. E. W. Parker, the Statistician of the United States Geological Survey, to have amounted to 230,838,973 long tons, equivalent to 258,539,650 short tons. As compared with the production in 1898, when the output amounted to 196,405,935 long tons or 219,974,667 short tons, this indicates an increase of more than 34,000,000 long tons (over 38,000,000 short tons), or 17·5 per cent. These figures exceed by 15,000,000 short tons the estimates made on the coal tonnage for 1899.

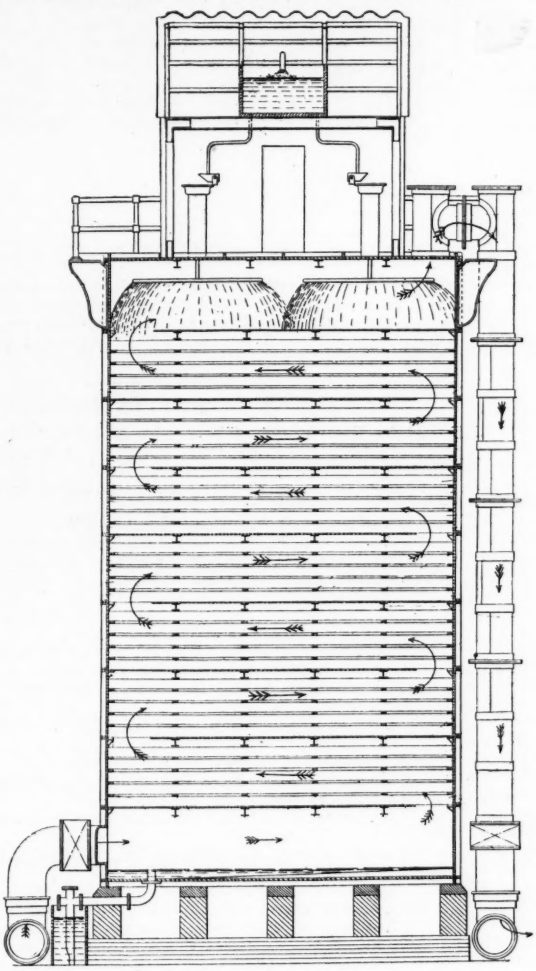
Excursion Meetings of District Gas Associations.—The dates of the Spring meetings of the Manchester, Southern District, and Midland Associations have been fixed. The members of the first-named Association will assemble at the Commercial Hotel, Kendal, of which town the President (Mr. T. N. Ritson, Assoc.M.Inst.C.E.) is Gas and Water Engineer, on Saturday next, and dispose of the few items of business on the *agenda*, which include the election of three new members. They will then drive to Windermere, and take tea together at the Royal Hotel, Bowness. The meeting of the Southern District Association will be held on the 31st inst. at Bristol, under the presidency of Mr. D. Irving. A visit will be paid to the electric power stations of the Bristol Tramways Company; a short paper, setting forth the arrangements made in the city for protecting the mains and services of the Gas and Water Companies, will be read; and there will be a drive to the Clifton Zoological Gardens, where high-tea will be served. The Midland Association will hold their meeting at Stafford, the home of the President (Mr. J. Ferguson Bell), on the 7th prox.

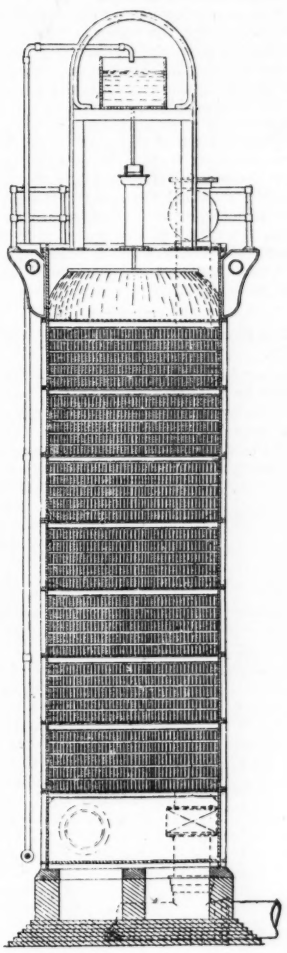
REGISTER OF PATENTS.

Gas-Scrubbers.—Stevenson, (Executrix of the late) G. E., of Manchester. No. 7474; April 10, 1899.

The patentee (whose final specification was filed by his widow, Mrs. M. S. Stevenson) proposed to employ in tower scrubbers perforated metal trays, arranged horizontally one above the other, and stopped off short of the opposite walls of the tower alternately. The trays carry boards on edge, or canvas screens, or the like, arranged in the direction in which the gas travels. A shower of liquid purifying agent falls down the tower, and through the perforations, wetting the boards or screens. The arrangement is such that the gas, in rising up the tower, travels to-and-fro over the trays, zig-zag, from side to side, and between the wetted surfaces of the boards or screens; and it is prevented rising up through the perforations in the trays by the liquid falling through the perforations.

In carrying out the invention, the patentee said he preferred to make the tower rectangular in plan, and about twice as wide from side to side as it was from back to front. In the scrubber represented, there





are eight perforated trays, made of No. 12 B.W.G. in thickness, and perforated with holes $\frac{1}{8}$ inch in diameter and 2 inches from centre to centre, arranged in rows 1 inch apart. The trays are carried by end-brackets cast on the walls of the tower, and by girders arranged cross-wise of the tower from front to back. The trays are stopped short of the wall of the tower at opposite ends alternately; so that, as indicated by the arrows, the gas which enters the tower by the pipe E must pass from side to side of the tower, in a zig-zag manner, in its ascent to the outlet pipe F, down which it passes after it has left the scrubber.

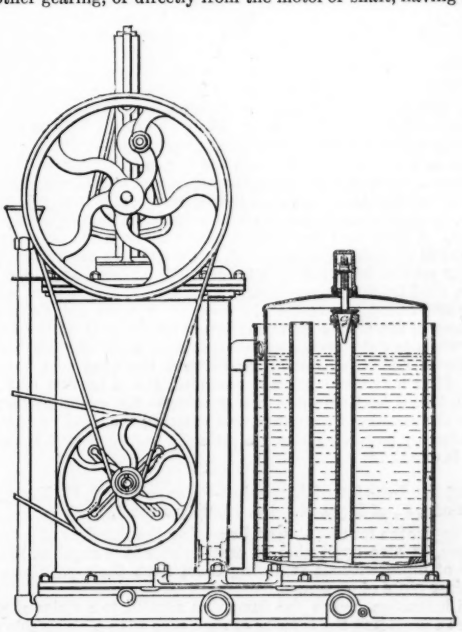
Between the trays, are rows of wood or canvas-screens, or the like, similar to those used in other tower scrubbers; but, instead of being placed one on the top of the other in a crossed position, the rows are arranged in the same direction—namely, in the direction of the greatest width of the tower—and each row is made to rest on packing boards placed on the bottom row below, so that there is a small space between each row. At the top of the tower, is an arrangement of the ordinary kind, for distributing a shower of water or ammoniacal liquor, or any other liquid purifying agent passing through the tower. The liquid in falling wets the rows of boards, and passing through the perforations in the trays, prevents the gas ascending therethrough.

The advantage claimed for the invention is that "the gas has a considerably increased length of travel in passing from the bottom to the top of the tower, and is all the while in contact with the wetted surfaces of the boards or screens, and exposed to the shower of liquid. The efficiency of the tower is, therefore, three times as great as a tower scrubber of the same size, or an equivalent efficiency may be made about one-third the height of the ordinary tower scrubber—thus saving a large proportion of the cost of the apparatus."

Gas and Air Compressors and Pumps.—Keith, J., of Farringdon Avenue, E.C. No. 11,593; June 5, 1899.

This invention relates to apparatus of the kind described in patents No. 14,057 of 1897 and No. 15,291 of 1898; and it has for its object to provide means for operating the pumping-bell from a rotary motor or running shaft, in cases in which an automatically controlled hydraulic or like motor cannot be conveniently applied.

To that end (as shown) the pumping-bell is fitted with a piston-rod which passes upwards, downwards, or outwards through a gland or water-seal in the casing of the apparatus; and there is connected thereto a crank and a rod or eccentric, or like device, on a shaft which is driven by belt or other gearing, or directly from the motor or shaft, having a rotary



motion. The result is "to obtain an easy working rectilinear motion on the compressor from the circular motion of the driving power."

The pump has inlet and discharge valves as described in the earlier

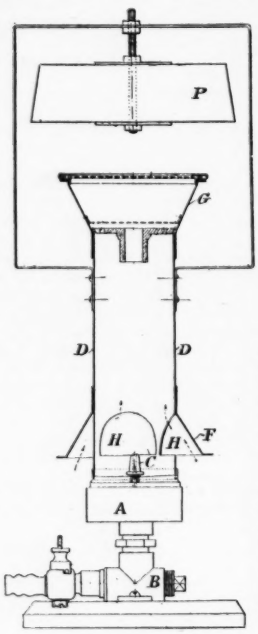
specifications; and it discharges by a stand-pipe into a holder loaded to the desired pressure. Inside (and preferably in the centre of) this holder is another stand-pipe, the lower end of which is connected to the suction side of the pump, and has a tapered valve on the top, opening upwards so as to give a gradually increasing opening over a considerable length of stroke. The valve is so arranged that, after the holder rises to a certain extent over its normal height, it engages with an adjustable tappet on the valve-rod; and the higher the holder rises, the larger the valve opening becomes. There is still another stand-pipe inside the holder, which is connected to the delivery-end of the apparatus, and through which the gas is drawn off to the burners as required.

When used for compressing gas or compressing and mixing gas and air for incandescent lighting, the pump is run at a practically constant speed—sufficient for the supply of gas to the maximum number of lights required. If then the supply of the compressed gas exceeds the demand, the holder rises, and by raising the valve allows a portion of the high-pressure gas to escape to the suction side of the pump; while, if all the burners are shut off, the gas is merely circulated through the apparatus.

In general, any regulation of the gearing or driving power is not required; but in special cases the loaded gasholder may be connected to the power supply for the motor, so that when the holder rises to its full height, it may partially cut off the supply of gas or other power for the heating of a hot-air motor, or otherwise reduce the power of the driver, and, consequently, the speed of the compressor itself. But when the holder again returns to its normal level, it in like manner turns on the supplies or power, and increases the speed of the apparatus—the whole being thus made partially self-governing.

Obtaining Intense Heat from Gas.—Delin, G., of Brussels. No. 3217; Feb. 17, 1900.

This invention—relating to apparatus "for obtaining intense and economical heating by means of gas, with a contrivance for accumulating and recuperating the heat"—is based on the principle "of creating, on the one hand, a large volume of mixed gas and air by suction, and retaining the same in a series of superposed chambers, in order to effect a more or less thorough mixture, by means of an eddying motion and general circulation; and, on the other hand, of giving a large surface to the opening in the apparatus where the flame is generated, so as to produce complete expansion, and enable the greater portion of the rays of heat which are used for horizontal radiation to be recuperated by the superposing, at a suitable distance, of an accumulating plate."



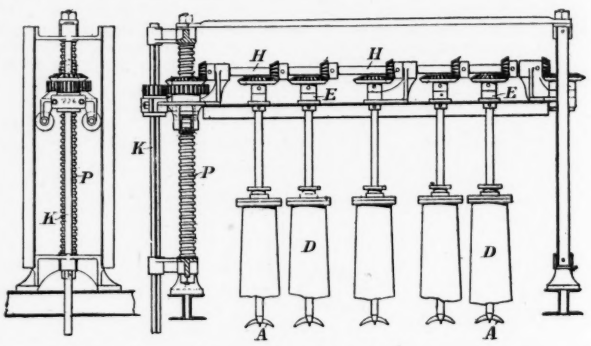
In the form of apparatus illustrated, the heating portion is composed of a box A containing a residue of petroleum, tar, or other substance, for enriching the gas, which enters the box by the pipe B, and escapes from it through the nozzle C. The box is surmounted by a mixing-chamber D, furnished at the upper and lower ends with cones F and G. Openings H are formed in the chamber D, inside the cone F, for admitting air to the mixing-chamber. The latter is closed at the top by a plug, which has an opening in the centre and smaller openings arranged around the central opening, as well as recesses formed in its circumference. Above the plug on the mixing-chamber, at a slight distance from it, a sheet of metallic gauze is arranged in the cone G; the upper part of the latter being also covered by metallic gauze. At a certain distance above the latter gauze, where the flame is generated, a plate P made of refractory substance is suspended.

When the cock is opened, the gas passes through the layer of enriching material enclosed in the box A, and issues in an enriched state through the nozzle C, rises into the pipe D, which forms the heating chamber or stove, and at the same time draws up a large volume of air through the openings H. The column of air and gas, in rising, meets with its first obstacle in the plug on the mixing-chamber. A portion of the mixture passes through the various openings, which are of such form as to maintain the draught of the fluids; while the larger portion is forced back towards the bottom, and mixes afresh with the fluid that is ascending. In this way, there is a continuous eddying and circulating motion between the gaseous fluids drawn up at the bottom of the pipe-stove D, and those forced back at the top of the latter; while in consequence of the openings, a certain portion always enters the second mixing-chamber between the plug and the metallic gauze. Here a first expansion is produced, and a portion of the fluids is again forced back through the openings—the other portion flowing through the meshes of the gauze, and entering the third chamber, which is considerably larger. There "a perfectly thorough and homogeneous mixing is effected."

Cleaning the Interior of Ascension-Pipes.—Elliott, C., Damp, G., and M'Dade, J., of Leyland. No. 12,012; June 9, 1899.

This apparatus for cleaning and scraping the interiors of retort ascension-pipes, is also applicable to cases where it is required to clean the interior of pipes without removing them from their position—such as economizer pipes of steam-generators.

The illustration shows the invention applied to a series of pipes. It consists in providing the interior of each pipe with a revolvable cutter or scraping appliance A, mounted on a shaft which passes through a packed gland in the end of the pipes D. In order to rotate the cutters and traverse them within the pipes (so that all accumulations are removed), the cutter-shafts are secured in bearings in brackets E, supported by angle-irons carried by end-brackets; and the shafts are driven by suitable gearing. The cutter-shafts are provided with bevel wheels gearing with bevel pinions secured to a horizontal shaft H, to which motion is imparted by a pinion J slidably mounted upon a vertical shaft K, which is revolved by a hand wheel or by power.



To traverse the cutters vertically, each end of the apparatus is provided with a screwed shaft P, the bevel wheels on which are formed as nuts upon the shafts. Therefore, as the bevel wheels are rotated to revolve the cutters, they and the cutter-shafts are raised vertically so as to traverse the latter within the pipes.

APPLICATIONS FOR LETTERS PATENT.

7446.—Hill, T. & M., "Generating Acetylene." April 23.

7481.—Spooner, A. F., "Carburettors." A communication from C. Bouché and F. P. de la Montluel. April 23.

7487.—Chandler, D. & S. B., "Combining known parts of gas apparatus advantageously." April 23.

7495.—Zimmer, G. F., "Conveyors." April 23.

7505.—Lacroix, P., "Burners of the bunsen type." April 23.

7528.—Allison, C. A., "Rotary pumps.' A communication from The P. H. & F. M. Roots Company. April 24.

7539.—Morin, R., "Generating acetylene gas." April 24.

7595.—Thompson, W. P., "Self-lighting gas-burners." A communication from A. Simonini. April 24.

7596.—Thompson, W. P., "Lighting devices for causing the ignition of gas." A communication from A. Simonini. April 24.

7650.—Scammell, A. E., "Gas-lamp, suitable for lighting and heating purposes." April 25.

7707.—Bibbero, M., "Regulating screw for controlling gas-pressure in elbows or burners." April 26.

7751.—Seagrave, G., "Generating acetylene gas." April 26.

7754.—Bullock, A. R., "Gas pressure reducing and regulating apparatus." April 26.

7757.—Lake, H. H., "Gas and like engines." A communication from O. J. Friedman. April 26.

7797.—Wilkinson, J., "Burners for illuminating and heating purposes." April 27.

7798.—Wilkinson, J., "Gas-engines." April 27.

7846.—Sugg, W. T., "Torches for lighting gas-lamps." April 27.

7847.—Sugg, W. T., "Supports for mantles." April 27.

7859.—Johnson, G. W., "Generating acetylene gas." A communication from La Compagnie Française de l'acétylène dissous. April 27.

7860.—Johnson, G. W., "Regulating the supply of gas under pressure." A communication from La Compagnie Française de l'acétylène dissous. April 27.

7863.—Lewes, V. B., "Manufacture of coal gas." April 27.

7933.—Pink, L., and Vulkan, Gesellschaft für Selbstzündende Glühkörper mit beschränkter Haftung, "Manufacture of substances for use in impregnating incandescent mantles." April 28.

7934.—Busch, M., "Incandescent gas-burners." April 28.

7952.—Dempster, R., and Sons, Ltd., and Broadhead, J. W., "Coal, coke, and other like conveyors and elevators." April 30.

7962.—Rowbotham, K. A. & W., "Explosion engines." April 30.

8055.—Simmance, J. F., "Lighting and extinguishing gas-flames." May 1.

8100.—Bellan, E., and Camus, G., "Carburettors." May 1.

8195.—Louis, H., "Gas and other engines." May 3.

8228.—Foulis, W., "Charging, drawing, and stirring the charge in gas-retorts." May 3.

8235.—Glover, J. G., "Street and like gas-lamps." May 3.

8278.—Thwaite, B. H., and Mensforth, H., "Effecting ignition of combustible mixtures of low calorific value in gas-engines." May 4.

8348.—Knöfler, O., "Improvements relating to the production of intense light." May 5.

8381.—Roberts, H., "Fluid meters." May 7.

8387.—Fawcett, P. W., "Fluid meters." May 7.

8436.—Biheller, S., "Lanterns for incandescent gas-lights." May 7.

8524.—Simpson, S., "Coin-freed mechanism applicable to gas, electricity, and like meters." May 8.

8625.—Hein, A., "Automatic apparatus for transmitting fluids any required distance." May 10.

8634.—Legge, J. St. C., "Renovating incandescent gas-mantles." May 10.

8635.—Legge, J. St. C., "Incandescent lighting." May 10.

8640.—Scheidt, B. von, "Gas-motors." May 10.

8655.—Moss, R. J., "Generating acetylene gas." May 10.

8666.—Menz, P., "Reducing valves." May 10.

8675.—Forbes, Sir C. S., "Bye-passes for gas." May 10.

8720.—Justice, P. M., "Automatic gas-lighters." A communication from C. W. Bernson. May 11.

8782.—Jackson, W. L., "Gas-burner." May 12.

8790.—Fairweather, W., "Incandescent burners." A communication from the Standard Incandescent Burner Company. May 12.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Mr. Carpenter's Paper on Inclined Retorts.

SIR,—Mr. Carpenter's letter and reply to the discussion on his paper, which appeared in the last issue of the "JOURNAL," would not call for any comment were it not for the fact that they contain some statements that need qualifying, and that their tone may possibly have, in some cases, a deterrent and prejudicial effect upon an important and increasingly adopted system of the gas industry—the carbonizing of coal in inclined retorts. No one regretted more than myself that Mr. Carpenter was unable to reply personally and verbally to the discussion. It might have been expected, however, that the unavoidable absence of the author of a paper, read and discussed at a technical meeting, would have induced him to reply in the fullest possible manner to the questions and criticisms of his fellow-members, when such opportunity of doing so offered itself. It hardly seems adequate, therefore (to use no other word), for Mr. Carpenter to sweep on one side a naturally large portion of the discussion, and to remark, "as regards mechanical details, my reply would simply be a reiteration of the wording of the paper."

Mr. Carpenter quotes with approval the remark of some engineer that "you burn your boats when you put up inclined retorts." This may mean anything or nothing. One might reply that if your boats (or benches) are rotten, uneconomical, and out of date, the sooner they are burnt, the safer and better. The inclined-retort system is certainly by now sufficiently established and experimented with to put it altogether out of reach of such a simile as that of "burning your boats." And is it not passing strange that the author of "Inclined Retorts at Bankside" should have opened his reply with such an analogy, when he went for the inspiration of his Bankside installation to the Brentford Gas-Works, where all the boats have been burnt, or, in simpler language, where there are no retorts but those on the inclined system? All the horizontal retorts at these works have been replaced by inclined, because of the satisfaction given by the latter; and the same transformation is also in course at the Southall works But Mr. Carpenter's paper was written for those who "are anxious not to burn their fingers" with inclined retorts. To describe and point to a confessedly imperfect arrangement, seems a somewhat curious way of inculcating a general lesson of avoidance. Mr. Carpenter, in fact, puts himself in the position of a man, who, unaccustomed to the lighting of a fire, tries to do so, only succeeding in burning his fingers, whereupon he advises all his friends to dispense with the comfort and utility of fires, and points to his own unfortunate experience as a sufficient reason for their denying themselves.

The difference between the author's paper and his reply is striking. The former gave some the impression that the installation described was, generally speaking, a success. Mr. Carpenter himself says that "he came to the conclusion that he could equally make inclined retorts a success" at Bankside as at Brentford; and, later on, he remarks that "only one defect made itself apparent in the plant." This certainly seems to offer some contrast to the statement in the reply to the discussion that he did "not claim to have a perfect solution of the labour-saving part of the problem," and a further reference to "the want of success stated." Mr. Carpenter claims "to have proved conclusively that success or failure of the system depends, first and foremost, upon the suitability of the coal." But, in his paper, he records the fact that at Brentford "he saw various kinds of coal operated, large and small, dry and damp;" and the success of the system at Brentford is admitted.

It is really too late in the day to endeavour to limit the applicability of the inclined-retort system to certain restricted classes of coal. The extensive area (naturally necessitating the use of all kinds of coal) over which inclined retorts have been adopted during the last ten years, will refute this contention. For some of the following approximate figures, I am indebted to Herr Lenz, of the Stettiner-Chamotte Company. They give the number of lineal feet of inclined retorts already erected in Europe:—

Great Britain	96,000
Germany	40,200
Austria	23,100
Switzerland	6,700
Italy	3,300
Denmark	3,100
Sweden	2,700
Spain	2,300
France	1,400
Belgium	1,100

It would be interesting to know who has told us that "perfection does not exist in Nature." I have always been given to understand that the very reverse is the case, and that one looks to Nature for the best, most perfect, and economical adoption of means to ends. It is by employing, in some way and to some extent, Nature's laws and forces in the system of carbonizing coal by inclined retorts that some engineers have conferred benefits upon the gas-worker and the gas consumer alike. It is, therefore, "a little disappointing" to find that the Engineer of the South Metropolitan Gas Company will not, in the future, be counted among them.

May 18, 1900. C. E BRACKENBURY.

Concerning Coal Exports and Political Economy.

SIR,—As you do not join issue with my contention that an export duty on British coal is not economically justifiable, I have not to further argue the general question. There are, however, one or two points in your editorial comments upon my arguments that I may, perhaps, be allowed to briefly notice, and, if I am able, to answer.

In the first place, you think I would have been more conclusive in my reasoning had I descended from the general to the particular. Well I tried to argue the point broadly, in such a way that my arguments could be applied to any specific case. Apparently not with complete success, for you put one that my arguments would, I should have thought, have met. Supposing, you say, that a five-shilling duty on British coal were to keep a possible foreign buyer out of the market just when prices were trembling in the balance, would not the coalowner come to easier terms with the home purchaser? Does not my answer to my own question apply exactly? I said: "What would be the result of a duty that would stop all exports? To reduce the price at home? 'Yes,' at the present time; but in the normal condition of the coal trade, when coal is sold at a price only sufficient to earn a bare margin of profit, 'No.'" For, as I pointed out, if the coalowner lost definitely his foreign customer—and it is surely not proposed that an export duty should only be put on every now and then just when the home consumer thought it advisable—he would reduce his production to the level of the home demand. The answer to such a particular question as you put does not, in fact, cover the whole problem.

Then you say it is difficult to understand, on the general principles of political economy, why the price of gas coal should double in two years. "Was it too cheap in 1897, or is it too dear to-day?" Well, if I ever learned anything from political economy it was this, that the price-value of any commodity is that which the buyer will give and the seller take; and it therefore depends absolutely upon the relation of the demand to the supply. The answer to your question is, I take it, that gas coal was neither too cheap in 1897, nor is it too dear to-day—the price-value being something quite distinct from the intrinsic value. Food in Mafeking during the latter days of the siege was probably twenty times the price it was eight months ago; but it was not too dear. It was worth its price to the buyer The same with coal. It is worth just what it will fetch; neither more nor less.

Political economy, you say, does not help the expert in its principles to make better bargains than the ignorant and foolish; it does not enable its votaries to foretell much within its own purview. But is that true? Has it not enabled the English nation to make better bargains with the world at large by pointing the way to Free Trade? We make a very good bargain with France when we admit her bounty-cheapened sugar duty-free. We get sugar below cost price because France is, on this point, ignorant and foolish. Do we not get the best of the bargain, and did not political economy enable us to foretell the result? Again, if the imposition of an export coal duty would be disastrous to trade, is it not the teachings of political economy that enable us to avoid the disaster? True, the study of Mill cannot be a substitute for the acquirement of accurate knowledge of the markets in which a man has to deal, nor for the exercise of intelligent judgment. But does that prove political economy to be a purely academic and futile study?

As to the hair-splitting and altogether unpractical distinction between calling Sir Isaac Newton's deduction from the coincident conduct of myriads of falling bodies the "law of gravitation," or "a brief description of observed similarities," I can only remark that it is a curious quotation for one to make who has apparently a practical man's contempt for "schools." It is logic-chopping that reminds one of the psychology class. Let Dr. Poynting, if he really doubt that it is an immutable law, throw himself over Beachy Head, and see if he be favoured with a different experience from the unlearned.

The question for which you suspect that scholastic political economy has no answer, does not, I confess, appear a difficult one. If a Frenchman will offer us more for an article than even its uniqueness and superlative goodness make it worth to us, let us by all means sell it to him. As a nation we are richer by the so much more. If the article be really priceless to the nation—as it might be argued coal suitable for the Navy is—then the nation *qua* nation must acquire it from the owner at a higher price than any foreigner will give. I do not pretend to be a political economy scholar; but there does appear to me to be an answer to your question not inconsistent with any principle of political economy.

May 19 1900. YOUR CORRESPONDENT.

The Calorimetry of Coal Gas.

SIR,—Dr. Colman's admirable paper will attract attention to gas calorimetry. I wish to add the history of the system of testing which he adopted.

In 1882, the President of the British Association of Gas Managers expressed regret that no reliable method of ascertaining the heating power of coal gas existed—his remarks being elicited by a paper on the subject read by the late Mr. F. W. Hartley. In 1884, Mr. Hartley produced before the same scientific body the first practical gas calorimeter. A full description is given in the "Transactions;" but, briefly, the principle is that of absorbing the heat from a stream of gas products by a stream of water—the two being separated by thin walls of metal. Eight years after, the same principle was "introduced into England" by Herr Hugo Junkers, of Dessau.

I wish emphatically to claim for the late Mr. Hartley the inventorship of the modern gas calorimeter; and I am certain that Dr. Colman was not aware of the fact that, in referring to "Junker," instead of "Hartley" (or to "Hartley-Junker"), he was doing an injustice to the memory of a man who is not yet quite forgotten.

Ravenscourt Park, W., May 17, 1900. JNO. F. SIMMANCE.

Sunday Labour in Gas-Works.

SIR,—Having had many years' experience in the management of gas-works, I should like to express my conviction that Sunday labour in gas-works can be almost entirely dispensed with. My rule has been to cease work for twelve or fourteen hours in autumn, winter, and spring. In the summer months, I stop working for the whole twenty-four hours; and this would be done all the year round with ample storage or sufficient plant to easily produce seven days' maximum consumption in six days. That this can be done is a settled question; that it ought to be done should also be a settled question. The loss, if any, would be very slight; and it should be cheerfully borne by shareholders or consumers, in justice to the workmen, to whom the advantages would be very considerable.

Redditch, May 17, 1900. THOMAS LAYTON.

Local Authorities and the Price of Gas.

SIR,—Your correspondent of last week, in desiring to know what Local Authorities intend doing to meet the increased cost of gas manufacture,

can hardly expect to be furnished with collective information as to the prospective action of such authorities, which would, of course, be difficult to obtain by even the most experienced of those conversant with the administration of gas undertakings by local governing bodies.

Having devoted a little attention to the subject, I should like to point out to him that, from Midsummer last to the present time, of those gas authorities whose increases in price have been recorded in your columns, Local Authorities have not on the average raised their prices to such an extent as Gas Companies—thus leading one to the conclusion that they do not intend their gas consumers to bear the whole burden of the general advance in the price of coal and other materials, and continue to provide the useful surplus profit which your correspondent apparently abhors.

Permit me also to call his attention to a portion of Mr. Livesey's evidence before the Parliamentary Committee the other day, in which the Chairman of the South Metropolitan Gas Company is reported to have said that his Company were not paying as much dividend as the price of gas allowed them to do; and he further remarked "that this year they would have to lose dividend," which probably means additional reciprocity between supplier and supplied in the present condition of affairs in gas matters.

If this view be correct, his example is to be commended. As far as the municipal gas consumer is concerned, it cannot matter whether the price of gas is necessarily increased, or the rates go up; for whatever he contributes, either in the way of surplus profit or in direct taxation, is chiefly spent in his own neighbourhood; whereas, in the case of companies, the dividends provided are generally distributed over a larger area, to the detriment of local residents.

Why, then, should there be any apprehension on the part of your correspondent as to the effect on Mr. Ratepayer, who, if he neglects to consume municipally manufactured gas, and fails to participate in the accompanying advantages, has, I should think, no one but himself to blame.

G. T.

May 11, 1900.

The Inquiry Circular Nuisance Again.—A correspondent sends a copy of a circular of inquiry with which he has been "favoured" by the Town Clerk of an important borough in the Eastern Counties, dealing with the "Salary and Duties of Engineer and Manager of Water-Works." Most readers, after glancing through the following list of questions (to which a *gratis* reply is expected), will agree with our correspondent in considering the circular as "inquisitive and exceptional": 1. Name of town. 2. Population. 3. Is your water supply (*a*) by pumping from deep wells, or (*b*) by gravitation from collected sources into reservoirs? 4. If by pumping, what is the cost per million gallons? 5. What is the salary of your Water-Works Engineer or Manager? 6. What is the number and amount paid for salaries to his office staff? 7. What is the number of, and wages paid to, the out-door staff—including out door foreman, turncocks, pipe-layers, labourers, &c.? 8. What is the number and wages of your pumping department staff—viz., engine fitters, drivers, and stokers? 9. What is the number of water-fitting and waste inspectors, and wages paid? 10. Does your Engineer or Manager design and carry out all extensions to, and alterations in, your water-works buildings, pumping plant, &c.? 11. Have you a Consulting Engineer; or do you call in expert advice on the above matters? 12. Number of meters in use; and if repaired by your staff? 13. Is your Water Engineer or Manager allowed private practice or to take pupils?

LEGAL INTELLIGENCE.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Wednesday, May 16.

(*Before the* MASTER OF THE ROLLS *and Lords Justices* RIGBY *and* COLLINS.)

The Welsbach Incandescent Gaslight Company, Limited, v. The New Sunlight Incandescent Company, Limited.

This was an appeal by the plaintiffs from the order of Mr. Justice Byrne of April 28 (*ante*, p. 1135) directing them to make a further and better affidavit in answer to interrogatories. Plaintiffs brought their action in respect of an alleged infringement of the 1893 patent; and defendants said that, before the date of the patent, the Welsbach Company's predecessors in title made and sold mantles pursuant to the invention contained in the 1893 patent. The Secretary of the plaintiff Company had been interrogated upon the subject; and he objected to answer, except in regard to such knowledge as he possessed as an officer of the Company.

Mr. MOULTON, Q.C, Mr. T. TERRELL, Q.C., and Mr. WALTER appeared for the appellants; Mr. BOUSFIELD, Q.C., and Mr. NEILL represented the respondents.

After a long legal argument,

Their LORDSHIPS allowed the appeal, with costs; holding that the objection taken by the Secretary was well founded.

LLANELLY POLICE COURT.—Wednesday, May 16.

(*Before Messrs.* H. WILKINS *and* T. JONES.)

Unlawfully Connecting a Gas-Meter—The Publication of Notices of Penalties to be Sued For.

To-day an adjourned summons, taken out under section 18 of the Gas-Works Clauses Act, 1847, by Mr. A. R. Cawley, Manager and Secretary of the Llanelly Gas Company, against William Ewart Francis, a plumber, for connecting a gas-meter at No. 59, Station Road, Llanelly, without the consent of the Company, was disposed of. There was also a summons against John Bowen Harries, a builder and ironmonger, for causing a pipe to be laid; but this was not gone into.

The facts were as follows: On the 5th of January last year the occupant of the above-named house left it, and an employee of the Company took a reading of the meter, disconnected it, and plugged the service-pipe. On the 13th of February last, one of the Company's collectors visited the premises, and found that the meter had been reconnected, and that gas was being supplied without their knowledge or consent. The meter was connected on Nov. 6, 1899, by Francis, who was in the employ of Harries. It appeared that Francis was asked by the tenant if it was necessary to make any application to the Company, and he replied that it was not. Francis acknowledged to the Company's Manager that it was he who fixed the meter, and it was admitted that "a connection had been made which ought not to have been made." The matter had been before the Court a fortnight previously, when the case was adjourned on two technical objections—the one most relied upon by the defence being that it was necessary, according to section 145 of the Companies Clauses Consolidation Act, 1885, to have posted at the works and other places lists of penalties for various offences, and that this had not been done.

Mr. W. HOWELL appeared for the Company; Mr. T. R. LUDFORD represented the defendant.

Mr. HOWELL replied to the arguments advanced on the other side, and stated that, although there was no desire to press the case, it was important that the Bench should mark their sense of the wrong done to the Company, if only by the imposition of a small fine. On the point of law, he held that section 15 of the Gas-Works Clauses Act, 1871, did not require any such publication as that mentioned in the Companies Clauses Consolidation Act, and that therefore the Company had the right to ask for conviction without the publication of notices. However, if it were insisted by his friend that the chief objection should stand, and if he were supported by the Bench, he (Mr. Howell) would have no course left open but to apply for another summons under the section he had named.

Their Worships having deliberated in private,

The CHAIRMAN said that since the matter was before them on the previous occasion, the Clerk had gone thoroughly into the case, and had advised them most carefully and learnedly. They could not see their way at that stage to amend the summons, and they must dismiss it; being convinced that the non-publication of the notices required by the Companies Clauses Consolidation Act was fatal.

Mr. LUDFORD applied for costs on behalf of both Francis and Harries. He said that Mr. Howell, in his opening statement, had charged a respectable tradesman in the town with fraud.

Mr. HOWELL repudiated the allegation.

Mr. LUDFORD said the offence alleged was a criminal one. He was sorry he was unable to get Mr. Harries to the Court to give evidence, as he would tell the Bench that he knew nothing whatever of what had taken place. He was summoned after making an explanation to the Company. They had not the slightest cause for taking the proceedings, and were wrong from the outset. They had no legal grounds for their action, and therefore it would only be just on the part of the Bench to grant costs to Mr. Harries.

Mr. HOWELL urged that the Company were simply doing their duty to the shareholders in taking these proceedings. He said it was not essential, in a charge of this kind, that knowledge on the part of Mr. Harries should be proved. He asked the Bench not to allow costs in a case which had not been fought upon its merits, but upon "a miserable technicality."

The CHAIRMAN said the Bench refused to allow costs, and were satisfied that no imputation of fraud was intended.

The summons against Mr. Harries was withdrawn.

Embezzlement by a Water-Rate Collector.

Arthur Hill, of Rochdale, who was employed by the Corporation to collect the water-rates in the Todmorden district, has been sentenced to six months' imprisonment as a second-class misdemeanant, for embezzling money received by him on behalf of the Corporation. It was proved that the defalcations had been going on for about four years; and the amount embezzled was something like £130.

Intimidating Gas Stokers at Newport (Mon.).

At the Newport (Mon.) Borough Police Court last Wednesday, before Alderman Phillips and other Magistrates, William Green, brickyard worker, was charged on a warrant with endeavouring to induce Joseph Hall to abstain from working for the Newport Gas Company, and also with persistently following him with the view of intimidating him. Mr. T. B. R. Wilson prosecuted; Mr. Watson represented Green. Mr. Wilson explained that some of the men employed at the Crindau Gas-Works declined to work certain machines which had been introduced for stoking the retorts. Other men who were brought into the works had to be kept there. But when any of them had chanced to go outside, they had been met and threatened. On the previous Saturday night, Hall and his companions were followed for an hour-and-a-half, and were threatened. Hall stated that he had been employed by the Newport Gas Company since the 28th ult.; and he left the works for the first time on the day named. Defendant started to follow witness and his companions, and when they went into several shops and public-houses they found Green waiting for them. Witness complained to the police that he was being followed. The accused was called, and denied having either followed or threatened the prosecutor. He had been employed at the gas-works as a winter hand, and had left eight weeks before, when the winter hands were sent off. Mr. Watson contended the charge had not been made out, and that there had been neither intimidation nor persistent following within the meaning of the Act. The evidence did not show that the prisoner had done anything to "compel" the three men who had given evidence to refrain from working for the Gas Company. The Magistrates found that both cases had been proved, and fined the prisoner 50s. in each, or two months' imprisonment.

The firm of Meldrum Bros., of Manchester—whose specialities are the "Meldrum" furnace, the "Koker" stoker, and the "Simplex" destructor—are converting their business into a Limited Liability Company. Ordinary stock will be taken by the vendors; and £50,000 of 5½ per cent. preference shares are to be issued to the public. The object of the issue is, we understand, to provide additional and extensive works to meet the demands for the firm's productions.

PARLIAMENTARY INTELLIGENCE.

Gleanings from the Committee Rooms.

About midday on Friday, the protracted proceedings on the three great London Gas Bills came to an end; and all that remained was to await the decision of the Committee who have shown so much patience and judicial spirit in dealing with the many questions and complications raised. Something like two hours were spent by the four honourable members in private deliberation; and—the Chairman having thoughtfully given an indication of the time he anticipated would be required—the parties concerned were free to beguile themselves during the interval as fancy dictated. The proceedings were naturally the main topic of conversation among them; and the coolest and most level-headed could not repress a little mild excitement, and speculate as to the fates of the Bills. Shortly before four o'clock the parties were admitted into the room; and the Chairman at once proceeded to announce the decisions. It was evident to the onlooker that Mr. Oldroyd, usually so imperturbable, was keenly sensible of the great responsibility that rested upon the Committee, and of the importance of the occasion. With measured tone, and in clearly worded sentences, which left no room for doubt on any point, he delivered first the decision on the prepayment section of the County Council Bill, then on the Gaslight and Coke Company's Bill, and lastly on that of the South Metropolitan Company. What effect the decisions will have upon the future of the gas supply of the Metropolis, it is, of course, impossible to predict. But it is safe to say that to the Gaslight and Coke Company, the result of their appeal for further capital is a calamitous one. The Committee have thrown out their Bill; and so for the third time within twelve months has Parliament—first by the Select Committee, then by a Lords Committee, and again by a Commons Committee—endorsed external criticism of the Company's past administration. The principal of the considerations which influenced the Committee last Friday in declaring the preamble of the Bill not proved was the fact that the provisions had not been drafted with any intention of meeting the recommendations of the Select Committee of last year, "which recommendations were largely based on evidence relating to this Company." The course which the directorate will now take will be watched with some curiosity by outsiders, and with the gravest anxiety by the proprietors, who have had the mortification of seeing the market value of their ordinary stock depreciate until it is below par. There is no question as to the Company being badly in want of capital; and, if compliance with the recommendations of the Select Committee, or any of them, is to be a *sine quâ non* to the procuring of fresh capital powers, then one fails to see how the present rate of dividend can be maintained and the value of the stock escape further depression. Reference to the other two decisions is made in a paragraph following the notes on the proceedings on the South Metropolitan Gas Bill. It may, however, be remarked here that the price fixed as the extra charge for prepayment meters and fittings will apply to the three London Companies, and provincial undertakings may in time be called upon to fall into line. As to the decision on the South Metropolitan Bill, the conditions on which the preamble has been passed have been left for the acceptance or refusal of the Company.

"*Cum grano salis*" is a phrase that is met with in print so frequently from childhood up that, as time rolls on, one has a disposition to smile at its use. But, although a little old-fashioned, there are occasions when it comes in very conveniently, by conveying briefly and politely what, expressed in other words, would perhaps appear to be a bit harsh. This is the excuse for making use of it here; and so readers will forgive the infliction. In his evidence in support of the section of the London County Council Bill relating to the regulation of prepayment meters, fittings, and charges, Mr. Haward told Mr. Oldroyd's Committee that, with other officers of the Council, he had seen Sir Courtenay Boyle at the Board of Trade; and the suggestion that these points should be embodied in the Bill came from Sir Courtenay himself. Now that is the statement reported in the "JOURNAL" last week; and it is hoped that it was taken by readers *cum grano salis*. Given a literal interpretation, it means that the Board of Trade endorsed all the proposals in this part of the Bill, and that they had been included at the instigation of the Permanent Secretary to the Board. The statement, it is evident, was taken with a grain of salt by Mr. Oldroyd and his colleagues; for, at the commencement of last week's sittings, Sir Courtenay Boyle presented himself for examination. He did this at the instance of the Committee themselves; and this made clear a desire on their part to learn at first-hand what was the exact attitude and feeling of the Board of Trade on the question. Sir Courtenay's version of what took place at the interview with the County Council officials gives one the impression that Mr. Haward is the unhappy owner of a very capricious memory. It now appears that what really was in Sir Courtenay's mind at the interview was that, in respect of the charges, the slot-meter consumer should have the same protection as the ordinary consumer; and this seemed to him to be a matter that could be dealt with by regulation. But as to approving of standard patterns for the prepayment fittings, and fixing the prices to be paid for them by the Companies, these were duties, in his opinion, altogether beyond the functions of the Department. He made it quite plain that the utmost the Board could do would be to approve of the meter to be used; but even in doing this, he foresaw difficulties, although not insuperable ones. It will interest provincial readers to learn that Sir Courtenay Boyle hopes that, if a standard is arrived at for London, it will be applied generally throughout the country.

If the Committee had been left alone with the Bill after Sir Courtenay Boyle's evidence, it would have been safe to say that it was doomed; but Mr. Danckwerts opened fresh ground by remarking that, if the matter could be settled by some practical authority under the Board of Trade, in the direction of limiting the charge, the Gaslight and Coke Company would be pleased to accede to it. Thereupon, Mr. Balfour Browne went one better by saying that the South Metropolitan Company would forego all profit on the prepayment meters—merely charging sufficient to cover the cost; all they desired being to make a profit on the sale of the gas. The County Council representatives were clearly in a dilemma; and the only course Mr. Worsley Taylor could find out of it was to suggest the withdrawal of the Bill and the corresponding part of the South Metropolitan Bill, and a conference with the three London Companies. Then Sir Courtenay Boyle came to the rescue, and offered, if the Committee thought any advantage would accrue, to invite a conference. A lengthened discussion ended in the Chairman suspending the County Council Bill, and relying on the parties concerned to use the good offices of Sir Courtenay Boyle to arrive at a settlement. What has happened will be found detailed in a subsequent paragraph.

This arrangement cleared the stage for the contest over the most remarkable gas measure of the session—that of the South Metropolitan Gas Company, upon which the eyes of the whole gas industry have been riveted. Such proposals as the Bill contains can only have emanated from the creative brain of one man, and that man Mr. George Livesey. If the first reading of the Australian Commonwealth Bill meant the nativity of a nation, the passing of the South Metropolitan Bill through Parliament would be the nativity of cheap and common-sense gas supply. For years past, the finger-post of the gas industry has borne the words "incandescent lighting," "heating," "cooking," and "motive power;" and in all four directions one meets with the same cry for cheap gas. But cheaper gas means lower illuminating power, and lower illuminating power the casting off of all enrichment processes. A gas unenriched by foreign means is the best, the scientists of the industry tell us, for use in the four directions in which the finger-post is pointing; and it is in these directions that gas suppliers must look, and are looking for the development of their business. To give the South Metropolitan Company power to supply the best gas that can be obtained from ordinary gas coal, without exterior enrichment, and to give the consumers the greater portion of any savings effected, are the principal objects of the Bill; and therefore it is the natural outcome of the great change which time has wrought in the demands and requirements of users of gas.

It is difficult to comprehensively describe the proposals of the Bill in limited compass; but they have already been so fully explained in these columns, that the merest outline will refresh readers' memories. In the first place, it is intended to amplify the present sliding-scale arrangement by ingrafting a third consideration—viz., the illuminating power. The Bill contemplates the varying of the standard price (which, by the way, is now 3s. 6d.) according to the illuminating power of the gas in this wise: 3s. 3d. for gas having the power of 16 or more candles, 3s. 2d. for gas of 15 and under 16 candles, and 3s. 1d. for gas of 14 and under 15 candles. The rate at which the dividend is to increase or decrease with the dropping or raising of the price of gas of any specified illuminating power is put at 1s. 4d. per cent. The comparative effect of the various sliding-scales on the dividend, for every penny from 3s. 6d. to 1s. 10d. per 1000 cubic feet, is shown in the table in Mr. Livesey's evidence. As the Bill was drafted, it was proposed that, for the purpose of determining and regulating the increase or decrease of the dividend by the increase or decrease of the illuminating power, the illuminating power of every half year shall be the average of all the official testings made during the half year; but it was proposed in the course of the proceedings to adopt a monthly average. Then, as already stated in the paragraph referring to the County Council Bill, it was intended to legalize a surcharge of 9d. per 1000 cubic feet in connection with the provision of prepayment meters and fittings. The promoters also ask for power to construct a railway between the South-Eastern Railway Company's line and the East Greenwich Gas-Works; and other clauses are to enable the purchase by agreement of the portion of the undertaking of the Gaslight and Coke Company on the south of the Thames. It should be explained that this summary of the various proposals (which were set forth at much greater length in the "JOURNAL" for Dec. 19 last) was prepared before the Committee's decision was known.

The case for the Bill was opened by Mr. Balfour Browne; and, the Committee having been instructed (as upon the Gaslight and Coke Company's Bill) to consider the recommendations of the Select Committee of last year, learned Counsel dwelt on them at some length. In giving an epitome of the provisions of the Bill, he showed that the Company had adopted the recommendations of the Select Committee so far as they could do so without imperilling the interests of the Company and of the consumers. A revision of the sliding-scale and a reduction of the standard price was proposed in a manner which would not affect the shareholders; but he made it clear that the Company set their faces sternly against any interference with the sliding-scale in cases—the Gaslight and Coke Company for example—where it would affect the security upon which capital had been subscribed. To make any alteration which would reduce the dividend on the old capital would amount to confiscation; but Counsel thought the Select Committee only intended their recommendation to apply to new capital. Sinking all personal interest in the matter, he argued strongly against the proposed fixing of five years as the outside period that the Companies should absent themselves from Parliament. With reference to the sinking fund suggested by the Select Committee, he pointed out that, to redeem capital in this way, would be taking money out of the consumers of to-day to relieve consumers hereafter. He commented very freely and forcibly on the proposal of the Company that they should be relieved from the obligation to supply 16-candle gas; and on the questions of the fixing of a charge for slot-meters, the construction of the railway in connection with the East Greenwich works, and the position of the Company in respect of the Gaslight Company's works south of the Thames he also expatiated.

The evidence for the Bill was splendidly marshalled; and it is impossible to put a finger on any one spot where anything was omitted that would have been useful. The major part of the evidence was naturally directed to the great proposal for a reformation in gas supply; and the Company, it was manifest, had spared no expense in ensuring that the Committee had before them the highest scientific and practical evidence on all points bearing on the question, in order to prove that the best interests of the consumers would be served in every way, under the changed conditions of the time, by having a natural coal gas supplied to them, unenriched by any extraneous means. The witnesses for the Bill were, in the order examined, Mr. George Livesey (the Chairman of the Company), Mr. Thomas Newbigging, Professor Vivian B. Lewes, Mr. C. C. Carpenter, Mr. William Sugg, Mr. W. H. Y. Webber, Dr. S. Rideal, and Professor Dewar. Their evidence is reported at length elsewhere; but, without particularizing either the witnesses or their testimony, we will here endeavour to indicate its trend.

The Committee were appealed to to allow the Company (who, with distinguished success, have for the past thirty years pursued the policy

of trying to satisfy their consumers) to carry out their proposals if only as an experiment; but other witnesses went on higher grounds and described the movement as a reform, a splendid precedent, and a marked advance in gas legislation. Enrichment was held to be a mistake, expensive, wasteful, and unnecessary in these days when such a large quantity of gas is used for purposes other than lighting and in incandescent burners. Without enrichment, it was contended, a gas would be produced of more uniform quality, and, providing a proper burner was employed, with less variation in illuminating power. Temperature, it was also pointed out, affected natural coal gas much less than enriched gas. Mr. Webber's evidence introduced some really new information on the subject of the supply of low-grade gas. It will be seen from the report that he has been investigating the question in Germany; and what he says shows that there they are certainly more enlightened in this regard than we are in this country. All that he told the Committee regarding the supply of low-quality gas in Germany, and as to the progress of incandescent gas lighting, and the causes of that progress, should receive the earnest consideration of everyone who has the interests of the home industry at heart. But turning again to the general drift of the evidence, it was maintained that the reduction of a penny per candle was a perfectly just and generous offer on the part of the Company. It was estimated that during eight or nine months of the year 75 per cent. of the gas manufactured by the Company was used for heating and cooking purposes; and several witnesses agreed that 14-candle gas would therefore, and in the matter of lighting too, adequately meet the requirements of the consumers. The calorific value of a lower grade gas was held by Mr. Newbigging to be greater than that of a higher grade gas; and Professor Dewar maintained that the difference of a candle or two in luminosity had no substantial effect on the heating value. On the other hand, Professor Lewes, while admitting a slight fall in calorific value between gas of 16 and 15 candle power and 15 and 14 candle power, was of opinion that, comparing the fall with the reduction in price, there was a gain to the consumer.

Under the proposed altered conditions, there was some anxiety in the minds of the Committee on the question of the fitness of the consumers' burners; but Mr. Livesey, with his usual decisiveness, to a large extent disarmed opposition on that point, at an early stage of the proceedings, by offering to be bound in the Bill to supply the Company's slot meter consumers, and any consumer in fact who cared to apply for them, with special burners of a new type made by Messrs. Sugg and Co. Mr. Sugg, it appears, has been dipping into futurity, and has seen that the days of low-grade gas were fast approaching. Very wisely therefore he set about preparing for those days by perfecting a burner which should be suitable for such gas; and Professor Dewar, having experimented with it, has assured the Committee that he is convinced Mr. Sugg has succeeded in producing what is required.

On the other points of the Bill, very little evidence was tendered. Mr. Livesey, referring to the clause which fixes the maximum charge for slot-meters and fittings at 9d. per 1000 cubic feet, was of opinion that, if there was to be legislation on the subject, he thought the precedent in regard to ordinary meters ought to be taken; and the Companies allowed to charge 10 per cent. on the cost of the meters, stoves, &c.—this being distributed over the average quantity of gas used. In regard to the proposed railway siding, Mr. Livesey was not very anxious about it; but Mr. Carpenter showed that it would enable the Company to transport material to and from the East Greenwich works more cheaply than at present, and be a safeguard in the winter. Concerning the suggested transfer of the Nine Elms works, Mr. Livesey was the only witness examined. He informed the Committee that the Company were willing to take over the works, provided they could do so on terms which would not entail a loss on the shareholders and consumers; but there would be little advantage in acquiring them. The figures offered and required for the works will be found in his evidence.

Six Vestries, the County Council, and the Corporation of the City of London were the opponents; but about their opposition there was nothing striking excepting its utter feebleness. The witnesses were Mr. Haward, Mr. W. J. Dibdin, Dr. Frank Clowes, Dr. Percy Frankland, Mr. Otto Hehner, Mr. Isaac Carr, Mr. C. R. Bellamy, and Mr. Thomas Fairley—most of them men of repute in their own particular spheres, but here engaged in trying to perpetuate something in quite another sphere which a changed condition of things demands shall be altered. Their case was built up of a small portion of practical evidence and a large amount of assumption, in parts of which ran a noticeable vein of dogmatism. The new departure proposed by the Bill was variously regarded by witnesses as objectionable, complicated, and disastrous. Their previous evidence in connection with the Portable Photometer Bill proved very troublesome to them; keen-sighted Mr. Oldroyd more than once desiring to know how the consumers would be injured if a homogeneous gas of about 15-candle power which would carry to the point of consumption replaced an enriched gas which, if the portable photometer tests were to be relied upon, suffered in transit from the works, and reached the consumers with a value of only about 14·8 candles. But Mr. Oldroyd failed to obtain satisfaction on the point. Another objection to the Bill was that it would destroy uniformity of illuminating power in the Metropolis, which cannot matter, seeing that the supply would be confined to a complete district south of the river. Then it was argued that the illuminating power in the southern district would be variable; but it can hardly be more so under the new conditions than the same witnesses testified not many days since that it is at present. Burners specially made for the lower quality gas were derided; and it was anticipated that the low-born gas would behave itself very badly. It would be more susceptible to draughts than a gas of a superior class; and a larger quantity would have to be consumed to get the same illumination. The poor consumers' accounts would greatly increase, notwithstanding the reduction of price that would be certain to follow; and the lowering of the standard price by 1d. per candle was not considered fair compensation to the consumers. Altogether, the new state of the consumer would be, from the County Council point of view, infinitely worse than the present. Some of the scientific witnesses appeared to have had an exceptionally poor experience of incandescent lighting; but that may be on account of their scientific training, which many successful users of the light have not had. It is a pity that Mr. Bellamy was permitted to escape from the witness chair without giving his scientific colleagues the benefit of his experience with street lighting by incandescent burners in Liverpool. It was further maintained that the calculation of the standard price on the illuminating power returns of the present testing-stations would not be fair; and no doubt Mr. Dibdin and others would like to subject the dividends of the shareholders of the Company to the tender mercies of the portable photometer.

The evidence was concluded on Thursday; and Friday morning was consumed by Counsel's addresses. During the speeches, it transpired that the Companies had agreed on the figure they felt they could adopt as a fixed extra charge for prepayment meters and fittings; but the County Council had not fallen into line. This was not very strange, seeing that practically all their cherished hopes in this matter had been knocked to the ground by the course of events before the Committee. It also appeared that, after further consideration, Sir Courtenay Boyle had taken no part in the conference, which was additional proof that the Board of Trade were not quite so solicitous in regard to the matter as Mr. Haward had tried to induce the Committee to believe. However, the Committee have practically adopted the views of the Companies; and they have done the County Council the honour of utilizing the shred which remained of their Bill in order to enact that 10d. shall be the maximum additional price to be charged for gas supplied under the prepayment system, that this is to be subject to revision in seven years, and that the Companies are to state the amount of the charges to the persons who pay them. Then as to the South Metropolitan Bill, they have declared the preamble of the Bill, as amended, proved. They consider it inexpedient that there should be a floating standard, and they therefore suggest that the new standard should be 14 candles, and the standard price 3s. 1d.—the conditions as to testing remaining exactly upon the same basis as at present. They also desire that provision shall be made for the supply of burners to consumers as offered by Mr. Livesey during the evidence; and that an undertaking shall be given by the Company that the gas produced under the new standard will be homogeneous, and not subject to the fluctuations which, in the mind of the Committee, seem to arise from enrichment. There are, of course, objections to the alteration made by the Committee in the vital part of the Bill; and whether the Company will accept or refuse it, has yet to be seen.

The Bill of the British Gaslight and Coke Company, Limited (Staffordshire Potteries), was down for the Committee stage last week; but before it was reached, the opposition was satisfied by a few inconsequential concessions, including, we believe, a little rebate in meter-rents. The Bill (which will therefore proceed as an unopposed measure) is to authorize the Company to expend for the purposes of the undertaking capital to the amount of £75,000, in addition to the sum of £197,610 already authorized by previous Acts down to 1895; and to empower the acquisition of land for the construction of extension works, the necessity for which was explained at the meeting of the Company in March last (*ante*, p. 817).

The Bill of the Grantham Gas Company, which has already passed the House of Commons, recently came before Lord Morley as an unopposed measure. The Parliamentary Agent for the promoters (Mr. Frere) submitted an addition to the clause dealing with the inspection of fittings, proposing to test gas-pipes by air pressure before the gas is turned on. The Engineer of the Company (Mr. R. G. Shadbolt) was examined in support of the proposal, and said it was intended as a safeguard against leakage, and would be of advantage both to the Company and to the consumers. The Company had already power to inspect fittings, &c.; but it was desirable that they should have the further power of testing. Lord Morley saw no special need to depart from the ordinary clause sanctioned by the House in regard to other gas undertakings. Unless some very special reason were advanced in favour of the additional powers sought by the promoters, he should decide that the clause as it left the House of Commons should stand. After some discussion, the proposal was withdrawn; and the Bill was reported for third reading.

The South Metropolitan Gas Company made another essay, when the South-Eastern Metropolitan Electric Tramways Bill was before a Commons Committee a few days ago, to secure protective clauses for their mains and pipes, and power to carry out themselves any alterations to their mains which may be necessitated by the construction of the electrical conduits. In regard to the latter point, a 2½-feet high-pressure main will be affected in this case; so that supervision by the Company's Engineer is absolutely needful from many points of view. The Committee, after hearing Mr. C. C. Carpenter and others, decided to allow the Company to do their own work, subject to an arbitration clause; but, respecting the question of electrolysis, it was considered that, as the electrical work will be executed under the Board of Trade regulations, a special clause was not required. Provided the regulations are carried out, Mr. James Swinburne says they will do much to keep down damage by electrolysis; but with earth-returns it cannot be prevented altogether. He cannot see why Gas Companies should not be compensated for damage to their pipes by electrolysis. There is justice in the proposition; but the South Metropolitan Gas Company's contentions for justice in this connection have not so far prevailed this session.

In dealing with the financial clauses of the Ilfracombe Improvement Bill, and the length of time in which a loan for water-works purposes should be repaid (the promoters proposing sixty years), the Chairman of the Police and Sanitary Regulations Committee of the House of Commons (Lord E. Fitzmaurice) raised the interesting question as to the effect of moorland and mossy water on the pipes. His Lordship knew of some districts in which such water had a destructive effect; and therefore he thought it might be necessary to curtail the time allowed for repayment. The Engineer to the scheme informed his Lordship that the water in some places acted in that way upon lead pipes; but on cast-iron pipes its corroding or oxidizing effect was very small. In this respect, the life of pipes with the Ilfracombe water was particularly good. The Borough Surveyor said that the existing mains had lasted 25 years; and in the case of the new scheme, it was proposed that the pipes should be glazed inside. The Committee subsequently allowed sixty years for repayment.

The reduction (from ten to five years) of the period allowed for the payment of costs incurred in connection with the promotion of Bills appears to be causing some little vexation among local authorities who

are promoters of Bills this session; and, as previously stated, very special reasons have to be shown to secure a relaxation of the new rule. The Chairman of Committees of the House of Lords (Earl Morley) has quite settled views on the subject. He considers the change is a very proper one; and therefore, when appealed to last Tuesday for an extension of the term by the Parliamentary Agents for the Barnsley Corporation Water-Works and Tramways Bill, he would not yield in the slightest degree.

HOUSE OF LORDS.

The following further progress has been made with Private Bills:—

Bills read the first time, and referred to the Examiners: Bedford Gas Bill, Wolverhampton Gas Bill, Woodbridge District Water Bill.

Bills read a second time: Gas Orders Confirmation Bills (Nos. 1 and 2), Water Orders Confirmation Bill.

Bills read a second time and committed: Glastonbury Corporation Gas Bill, Maidenhead Gas Bill.

Bill reported: Redhill Gas Bill.

Bills reported, with amendments: Barnsley Corporation Bill, Bristol Water Bill, Glastonbury Corporation Gas Bill, Grantham Gas Bill, Ossett Corporation Gas Bill, Rotherham Corporation Bill, Spalding Urban District Council (Water) Bill, Wetherby District Water Bill.

Bills reported [preamble not proved]: South Essex Water Bill, South Essex Water Board Bill.

Bills read the third time and passed: Bristol Water Bill, Gas and Water Orders Confirmation Bill, Grantham Gas Bill, Redhill Gas Bill, Spalding Urban District Council (Water) Bill, Wetherby District Water Bill.

The opposition to the Barnsley Corporation Bill has been withdrawn.

HOUSE OF COMMONS.

The following further progress has been made with Private Bills:—

Bills read the first time, and referred to the Examiners: Bristol Water Bill [Lords], Local Government Provisional Orders (Gas) Bill [Ilkeston and Rothwell Orders].

Bill read a second time and committed: Gas Provisional Order (No. 3) Bill.

Lords Bills read a second time and committed: Dorking Water Bill, Exmouth Urban District Water Bill, Fishguard Water and Gas Bill, Hemel Hempstead Corporation (Water) Bill, Mountain Ash Water Bill.

Bill reported [preamble not proved]: Gaslight and Coke Company Bill.

Bill reported with amendment: East London Water Bill.

Lords Bills reported, with amendments: Cleethorpes Gas Bill, Dorking Water Bill, Fishguard Water and Gas Bill, Higham Ferrers Water Bill, Kingston-upon-Thames Gas Bill, Mountain Ash Water Bill, Otley Urban District Council Water Bill.

Bills read the third time and passed: Bedford Gas Bill, Bradford Corporation Bill, Newport (Mon.) Gas Bill [Lords], Wolverhampton Gas Bill, Woodbridge District Water Bill.

Opposition withdrawn: British Gaslight Company Bill.

Petitions have been presented against the following Bills: Gas Provisional Order (No. 3) Bill [Wath-upon-Dearne and District Gas Order], Hemel Hempstead Corporation (Water) Bill [Lords].

Mr. Steadman has given notice of his intention to ask the President of the Board of Trade next Friday "whether there is any legislative regulation or restriction in regard to the use of, and supply by the London Gas Companies of, carburetted water gas; whether he is aware that in 1898 a Departmental Committee appointed by the Board of Trade recommended that the admixture of water gas with ordinary coal gas should be limited to 12 per cent., and that, by a Parliamentary Return in the same year, it was shown that some of the London Companies were even then using considerably over double that proportion; and whether, in view of the fact that there is reason to believe the amount has since been largely increased, and that water gas is four times as poisonous as coal gas and cannot be detected by its odour, he will consider the advisability of taking steps to initiate legislation on the subject, as has long been urged by medical and sanitary authorities, and by some means acquaint the public with the fact that they are being supplied with a poisonous article in the name of ordinary gas, so that due care may be taken in its general use."

Bolton Gas Profits and the Rates.—The Gas Committee of the Bolton Corporation have had before them the statement of accounts for the past financial year; and as a result they have resolved that £3294, part of the balance, be placed to the reserve fund account, and that the remainder, amounting to £20,000, be transferred in aid of the rates. Last year the amount handed over was £24,057, but in view of the enhanced price of coal the present result is considered eminently satisfactory. A draft estimate of income and expenditure for the current year has also been considered; and the Borough Treasurer has been directed to estimate for a sum equal to £10,000 as available in aid of the rates.

Helston Corporation and the Gas Company.—The dispute between the Helston Corporation and the Gas Company respecting the opening of the roads has been amicably settled. It was reported to the Council on Wednesday last that the Committee who had been conferring with the Company had arranged terms satisfactory to both parties, and without prejudice to the rights of either. The Council rescinded the resolution requiring the Company to ask permission three days before breaking the streets. Instead, it is agreed that, before opening the streets, the Company shall give three days' notice to the Surveyor of their intention to do so. A Committee was appointed to meet the Directors of the Water Company with a view to entering into a similar agreement.

THE DECISION OF THE PARLIAMENTARY COMMITTEE ON THE LONDON GAS BILLS.

The following is an account of the proceedings on Friday afternoon, when the Committee gave their decision on the three Bills—the London County Council Bill, the Gaslight and Coke Company Bill, and the South Metropolitan Gas Bill—the reports of which have occupied so much space in recent numbers of the "Journal" (see pp. 937, 1219, 1307, 1313), and are concluded to-day, pp. 1370-72, 1372-85.

On the re-admission of the public at the close of the Committee's consultation,

The Chairman said: The first Bill which the Committee considered was the County Council Bill—called the Gaslight and Coke, Commercial Gas, and South Metropolitan Gas Companies Bill. The Committee find the preamble of this Bill, as amended, proved. The Committee propose to amend it in page 3 of the preamble, line 17. They propose that this should read as follows: "And whereas it is expedient that the charges to be made by the Companies in respect of gas supplied by means of such meters and fittings should be regulated, and the amount of such charges stated to the persons who pay them"—leaving out the remainder of the clause. Further, I think I may say the Committee have decided that 10d. shall be the maximum additional price to be charged for gas so supplied, subject to a revision in seven years from this date. That is the slot-meter clause. I ought perhaps to remind you that the other part of the Bill was disposed of on a previous occasion.

Mr. Cooper said the Committee's decision affected the Commercial Gas Company; but they had not yet heard the representations of that Company with regard to the 10d.

The Chairman said the Company would have an opportunity of dealing with the matter when they reached the clauses. On the facts already before them, the Committee thought 10d. was the right figure; but they would hear anything the Commercial Company might wish to urge on the subject. Before going further, he wished, however, to say that the Committee had understood that the only point of difference was between the three Companies unitedly and the County Council, as to whether the figure should be 10d. or 11d.

Mr. H. E. Jones: I may say the Commercial Company do charge 10d. Our Agent did not know that when he was speaking just now. The Commercial Company will be satisfied with 10d.

The Chairman: Then the next Bill we had to consider, and upon which we announce our decision, is the Gaslight and Coke Company Bill. We find the preamble of this Bill not proved. Among other considerations, the Committee are led to this conclusion by the fact that the provisions of the Bill have obviously not been drafted with any intention of meeting the recommendations of the Select Committee of 1899, which recommendations were largely based on evidence relating to the Gaslight and Coke Company. Then with regard to the South Metropolitan Gas Bill, the decision of the Committee is that the preamble, as amended by the Committee, is proved. The amendment of the Committee is entirely in the clause which contains the principle and apparatus power of the Bill. It is on page 3, line 24. The Committee, after the word "the," have inserted the word "standard"—"And whereas it is expedient to alter the standard illuminating power of the gas supplied by the Company and the standard price to be charged therefor, and also to alter the variation in dividend dependent on the increase or decrease of such standard price as provided for by the Act of 1896." There we stop; the whole of the clause thereafter is thrown out. I am going to explain now the ground on which we have done it, and the end we have in view; and if we have failed in our attempt at draftsmanship, by the amendment we have just drawn up, to secure the purposes we have in mind, we shall be glad to receive any suggestions from Counsel. This is the amendment we suggest; and we suggest it on the following grounds: We think it would be very unwise and inexpedient that a floating standard—I think Counsel will know what we mean—should be adopted. We suggest, therefore, that the new standard should be 14 candles, and that the standard price should be 3s. 1d. This will obviate all question of variation of the standard according to the tests that are made; and the testing for the future will remain upon exactly the same basis, and subject to the same rules and authorities, as testing does now—the only difference being that the testers will look for 14 candles where formerly they looked for 16. The Company will be subject to penalties for deviation from the 14 candles, exactly as they are subject to penalties for deviation from 16 candles. These conditions are laid down by the Committee for the acceptance or refusal of the Company promoting the Bill; and also one or two other matters which perhaps I ought to name—*i.e.*, that provision should be made in the Bill for the gratuitous supply of gas-burners as has been suggested (the class of burners that has been named), and also the undertaking of the Company that the gas produced under the new standard will be homogeneous, and not subject to the fluctuations which, in the mind of the Committee, seem to arise by the introduction of enrichment. The Committee, on looking through the preamble of the South Metropolitan Bill, do not see any provision for slot-meter legislation. This, however, does not matter, because, seeing that we have passed the slot-meter legislation by adopting the County Council Bill, and therefore securing its application to all the three Companies in the Metropolis, it seems that the slot-meter clauses in the South Metropolitan Bill may go out. I think that is all. We have the Wandsworth Bill before us, which we propose to take on Monday. We presume that Bill will be easily disposed of on Monday and Tuesday; and that being so, we propose to meet on Wednesday morning at 11 o'clock for the settlement of clauses.

Mr. Danckwerts: Might I ask whether the preamble of the London County Council Bill, which the Committee have found to be proved, is the part to which the Chairman referred, and which the Committee have amended.

Mr. Cripps (Parliamentary Agent to the London County Council): Of course, the preamble will have to be corrected in accordance with the decision of the Committee.

The Chairman: I think, if I rightly appreciate your point, my reply will be this: The preamble of the London County Council Bill has been proved only so far as it relates to the slot-meters. The other part has been already announced as not proved. As regards the slot-meter clauses, we

shall consider any representations from Counsel for the Gaslight and Coke Company the same as by any other Company.

Lord R. CECIL: Perhaps Mr. Cripps will give us the clauses which he has submitted in respect of the slot-meters.

The CHAIRMAN: We shall be glad to receive suggestions from any of the parties with regard to the preamble. We, as laymen, have attempted to make an amendment of the preamble which we have no doubt is very faulty.

Lord R. CECIL: We will bring up the amendments to our Bill; and no doubt the other promoters will bring up the amendments to theirs.

The CHAIRMAN: I think I ought to say the County Council representatives will please not run away with the idea that their clause on the slot-meter is adopted—by no means. The wording of the clauses is quite open. We have simply approved of the preamble.

Lord R. CECIL: And said that some slot-meter clauses shall be passed as part of the County Council Bill.

Mr. NICOL: To meet the three Gas Companies.

HOUSE OF COMMONS COMMITTEE.

Monday, May 14.

(*Before Mr.* OLDROYD, *Chairman, Mr.* EMMOTT, *Mr.* NICOL, *and Mr.* STANLEY LEIGHTON.)

THE GASLIGHT AND COKE, COMMERCIAL GAS, AND SOUTH METROPOLITAN GAS COMPANIES BILL.

Part III. of the Bill promoted by the London County Council, which was to confer power on the Board of Trade to regulate the charge for, and the supply of, prepayment meters and fittings, was further considered to day.

Mr. WORSLEY TAYLOR, Q.C., Mr. TALBOT, and Mr. B. WILKINSON, appeared for the County Council. The other Counsel engaged were: Mr. LITTLER, Q.C., and Mr. H. A. RIGG, for the Corporation of the City of London; Mr. POPE, Q.C., Mr. CLAUDE BAGGALLAY, Q.C., Mr. DANCKWERTS, Q.C., and Mr. R. J. NEVILLE, for the Gaslight and Coke Company; Mr. LITTLER, Q.C., Mr. BAGGALLAY, Q.C., and Mr. SNAGGE, for the Commercial Gas Company; and Mr. BALFOUR BROWNE, Q.C., Lord ROBERT CECIL, Q.C., and Mr. L. W. S. ROSTRON, for the South Metropolitan Gas Company.

Sir *Courtenay Boyle*, K.C.B.

This witness, who is Permanent Secretary to the Board of Trade, was called at the instance of the Committee.

In reply to the CHAIRMAN, who asked if he could give the Committee any information as regarded the attitude of the Board of Trade towards the Bill, witness said that on Nov. 20 last a certain number of members of the London County Council called at the Board of Trade and had a conversation with regard to the first portion of the Bill. At the end of the conversation, he said he thought it was clear, from the evidence given before the Select Committee of last year, that the penny-in-the-slot consumer was paying a higher price for gas than the ordinary consumer. He said it also seemed clear that the system of charge by slot-meters was a convenient one, and expressed the opinion that it would be probably considered desirable to ensure that the statutory protection enjoyed by the ordinary consumer should also be enjoyed by penny-in-the-slot consumers; and that it seemed to him to be a matter which should be dealt with by regulation. He was asked whether it would be more desirable to proceed by Private Bill or by Public General Statute; and he said, without very much consideration of the question, that it might very well be dealt with by Private Bill in the first instance. The matter was left there, except that Mr. Haward, of the London County Council, had an interview with Mr. Hopwood, of the Board of Trade, following which a letter was written to the effect that the County Council might rely upon the benevolent attitude of the Board in any action which the Council might think fit to take to give effect to the recommendations of the Select Committee of last year with regard to automatic meters. The exact form of the proposals by which to legalize the recommendations, it was further stated in the letter, must necessarily be reserved for future consideration by the Board of Trade, until they had before them, not only the proposals of the County Council, but also any counter proposals of the Gas Companies. When the proposals of the County Council had been put into a Bill, the letter concluded, the Board would be glad of a copy. Further questioned as to the present views of the Board of Trade, witness said the proposals in Part III. of the Bill were calculated to give the Board very serious pause indeed. They proposed to enact that the Board of Trade should have the duty of approving standard patterns of prepayment meters and fittings, and fix the charges for the use of such meters and fittings. This was going a very considerable way, and a great deal in advance of any duty which had devolved upon the Board of Trade. The Board could approve a standard of meter, he thought, without very serious, or at least insuperable, difficulty; but if they were to be asked to fix the price, not only of the meters, but of the fittings by which the gas supplied by the meters was to be consumed, it was a serious thing indeed. Fittings, by the definition clause, included pipes, burners, stoves, and other fittings used in connection with the supply of gas by means of prepayment meters after it had passed the meter. This would place upon the Board of Trade the duty of approving and fixing the price of stoves, burners, and all things connected with the supply of gas. Probably the duty of the Board under the clause would be to approve, in the first instance, of the stoves of small consumers; but they might have to approve of cooking-stoves put in large houses. This seemed to be much beyond the functions of the State—certainly beyond the function of any State Department—to fix the price of a commercial commodity. By another phrase in the Bill—standard pattern—apparently the Board of Trade were to standardize the patterns of fittings. The word "standardize" was an ambiguous, doubtful word. What the State did was to standardize weights and measures; but he knew of no instance in which the State attempted to standardize a gas-stove or gas-burner. The Board of Trade had power, under the Electric Lighting Acts, to approve of a supply meter; and under the Gas Supply Acts, they undertook the verification of gas measuring standards used in the sale of gas—that was a gas-measuring machine, not a machine for the use of gas after it had passed the meter. Questioned as to whether the Board objected to the extension of the powers of the Board beyond those which now obtained, he said the most the Board could do was to approve the pattern of penny-in-the-slot meters. It would be a difficult thing to do, because the Board would have to ensure that the automatic meter was right in recording, on the putting in of the coin, the amount of gas supplied; but it could be done, and the Board would have no objection to that.

The CHAIRMAN: You said just now that you, as representing the Board of Trade, were under the impression that the gas supplied by these prepayment meters was charged at a somewhat higher rate than that supplied to ordinary consumers. How did you arrive at that?

Witness: I think it is so. The evidence given before the Committee of last year tended to show that.

Do you agree with the recommendations of the Committee of last year, presided over by Sir James Rankin?—I agree that the charge by the Gaslight and Coke Company should be the same on the north side of the Thames as on the south side. But Recommendation No. 3 goes on to say that the fittings should be of the same capacity.

Do you suggest that it is possible to have an effective regulation which will not affect the fittings?—I should say "Yes," so far as regards gas up to the point of fixing the meters. The State might approve of arrangements for the passing of the gas into the meter; but as to what becomes of the gas after it passes the meter, I do not think the State could interfere.

The price charged for the gas includes rent and depreciation of the fittings, which are part and parcel of the contract?—So I understand.

Mr. DANCKWERTS: It was so; but it is not now.

Witness: I do not think it is necessarily so. The Company can charge the penny-in-the-slot consumer for the gas supplied by the penny-in-the-slot meter. What happens with the gas after it has passed the meter is a matter for the consumer only. He can make his own bargain.

Mr. DANCKWERTS: The meter is regulated in such a way that it only passes so much gas as represents so much of the penny for the gas. The rest of the charge is for the fittings.

The CHAIRMAN said he understood this position. It seemed that, so long as the price fixed for the fittings was undefined, the Company were at liberty to make an excessive charge for that part of the contract; and that therefore, as a consequence, the consumer under the system was charged more than he ought to be, which practically meant that he was charged too much for the gas.

Witness was understood to remark that it was a matter of bargain.

The CHAIRMAN went on to say that from the evidence it seemed to the Committee that the consumers consisted of a class who could scarcely be considered independent. They could not go to the outside public who sold fittings and buy what they required. Their tenancy was very often short, and they could not burden themselves with the responsibility. In fact, he did not believe that the consumers could buy the fittings they required outside. The Gaslight and Coke Company, at any rate, were not aware of any means by which the consumer could get the fittings without going directly to them.

Mr. DANCKWERTS: That is in London.

The CHAIRMAN: Yes; I am speaking of London.

Witness admitted the difficulty. But the fittings were not a monopoly article. They might be supplied from outside at any time.

Mr. NICOL said he gathered from Sir Courtenay Boyle that the Board of Trade considered their control should not go beyond the meter.

Witness replied that that was so. The meter was a measure of supply—like a quart-pot or yard measure.

Mr. NICOL said the contention of the Board of Trade was that the State should not interfere beyond the meter, whether it was used in the ordinary way or as a slot-meter.

Witness said that was his position.

Mr. NICOL: You do not see how the Board of Trade can take up the further position of controlling these fittings?

Witness: I do not think it would be possible to do it.

Mr. EMMOTT asked what witness would suggest if the Committee were desirous of carrying out the suggestion of Sir J. Rankin's Committee, that the price of the fittings should be fixed. Would he advise the Committee to lay down a maximum?

Witness said that was a difficult question to answer. What Parliament could do was to fix the price to be charged up to the meter—not beyond. If there were any fittings necessary to the user of the meter for the passage of the gas from the street main into the meter, which must affect the value or quality of the gas so passing through the meter, then he thought they would be a matter for reasonable approval. But ordinary fittings used by the consumer after the gas had passed the meter, the State, to his mind, should have nothing to do with.

Mr. EMMOTT remarked that the slot system had grown up during recent years; and if the consumers preferred to take gas in this way, obviously they should have some protection.

Witness replied that they must take the consequences as to charges for fittings. If the public were overcharged, they must suffer to that extent. He could not see any means of preventing the mischief which would not create greater mischief.

The CHAIRMAN asked whether witness saw a difficulty in meeting the recommendations of the Committee of last year, which involved not only the regulation of the price of gas supplied through the slot-meters, but also the regulation of the price of the fittings?

Witness replied in the affirmative—if that by fittings was meant something beyond the meter.

The CHAIRMAN: That is what is meant.

Witness: Then we should not have anything to do with it.

Mr. NICOL said he understood that, when the sliding-scale was arranged, the decision was come to with the assent of the Board of Trade.

Witness replied that this was the case; and he should think that the penny-in-the-slot system could be worked out in the same way. He himself had not thought the matter over, to see how it could be done; but he had no doubt that it could be worked.

Mr. NICOL asked whether the result would not be that, instead of charging a penny, the penny would be divided.

Witness: No; the meter might be made to vary—that is, made to

supply a larger amount of gas for a penny under one set of conditions than under another.

The CHAIRMAN: We have it in evidence that a larger or smaller amount of gas can be supplied for a penny, so that the meters can be regulated.

Witness said that would meet his view.

Mr. LEIGHTON: Were you called before Sir James Rankin's Committee?

Witness: Yes; but speaking from memory, I do not think I was examined on this point.

Mr. DANCKWERTS asked if he might put a few questions to witness.

Witness said the learned Counsel could only put questions to him through the Committee. He came to supply the Committee with any information in his power—not to give evidence either for or against the Bill.

Mr. DANCKWERTS said he would not cross-examine. He wished to know if it would be possible to fix a standard percentage of profit on the total capital embarked on the fittings business by way of reward for extra consumption.

Witness replied that it might be done. He had not thought out whether this would be a satisfactory way of doing the thing. It would be going perilously near fixing the price of the fittings. The Board of Trade had power, under certain Acts, to require gas standards to be altered and varied; and these might give them power to sanction gas measurement under the penny-in-the-slot system.

Mr. DANCKWERTS drew attention to the duty of the Official Auditor, which was to certify the accounts if correct, or require them to be modified in the manner he thought right. Dividends were not to be declared until the accounts were certified by the Auditor. He wished to know if this power was not ample to enable the Auditor to keep control over a Company.

Witness said the Auditor, in extreme cases, could certify that the accounts were incorrect in principle. This was a useful power, and operated very well; but if he were asked whether this gave the Auditor control over the accounts of a company, he should answer "No."

The CHAIRMAN said they had it in evidence that there was great difficulty in keeping the prepayment-meter accounts.

Mr. NICOL: Assuming that a standard is arrived at by Parliament, should it be one that should apply, not to London only, but to the whole of the United Kingdom?

Witness: It is to be hoped it would apply generally. If the Bill were carried, a vast amount of work would be cast on the Board of Trade which would be carried out purely for the benefit of the Metropolis.

Do you think the system, as proposed, could be adopted for the whole country?—The penny-in-the-slot system is spreading all over the country; and any principle adopted in respect of it should hereafter be adopted in the rest of the United Kingdom.

Then, do you think it desirable for Parliament to adopt the clauses contained in Part III. of this Bill, and deal with the question as a whole?—There is a good deal to be said for that; but we know that Parliament has proceeded in these matters step by step. If we could get a settlement of this question in the Metropolis, it might assist in arriving at a settlement in other parts of the country.

Have any of the London Gas Companies approached you on this subject, or are the London County Council the only authority who have approached you?—There is a clause in the South Metropolitan Company's Bill dealing with the question of the slot-meters; and on this we have had interviews and communications. That is the extent to which we have been approached.

Mr. DANCKWERTS said that, on behalf of the Gaslight and Coke Company, he wished to say that if this matter could be settled by some practical authority under the Board of Trade, in the direction of limiting the charge, the Company would be glad to accede to it.

Mr. BALFOUR BROWNE said that, on behalf of the South Metropolitan Gas Company, he would go one better. His Company did not want to make a profit out of these meters; but they did wish to make a profit on the sale of gas through the meters. They only wanted to be saved from loss on the meters—on the charge for meters and repairs and management in connection with them. They only desired to cover the cost; and no doubt Sir Courtenay Boyle would say that was only fair.

Mr. DANCKWERTS remarked that his Company were perfectly ready to see a Committee appointed at once in the matter.

Counsel representing the Corporation of West Ham said his clients would like to see provision made for the due investigation of the accounts of the Gas Companies by some authority or other.

Mr. BALFOUR BROWNE felt bound to say he thought the Committee could settle the points in dispute between the parties.

Mr. LEIGHTON asked whether he might take it that the Board of Trade did not think the preamble of the Bill was proved?

Witness replied that this was rather a question bearing on policy. He, however, did not think that the supply of fittings for the prepayment system should be regulated by the Board of Trade.

The CHAIRMAN said witness was assuming that the Board of Trade would be asked to deal directly with these questions. Would it not be possible for them to appoint some body of experts to deal with them?

Witness said they should not be asked to appoint an authority to fix the price of fittings. He did not think it was in the power of Parliament to create such an authority. If the meter was to be standardized, and a price fixed for the gas, well and good; but when the price had to be settled for the use of the fittings, he said it was impossible to do it.

Mr. NICOL remarked that he had been a member of the Committee of last year; and his view had been that the question as to the meter was important, and must be dealt with. The business was a new one, and was extending very largely over the Metropolis. His idea had been that the legislation passed should be such as would set up a common standard applicable not only to the Metropolis, but to the whole of the United Kingdom. Was this the view of witness?

Witness replied in the affirmative. He added that if Parliament in its wisdom settled the question in the Metropolis, the decision would be of considerable use to the other Companies. He did not think that Part III. of the Bill should be adopted in its present shape.

The CHAIRMAN: If the Committee were of opinion that some satisfactory charge should be found to cover the cost of fittings and maintenance and depreciation, it would be within the province of the Board of Trade, and their wish, to adopt it?

Witness: Yes; if it can be done. The open market may come; and these fittings may be procurable there.

The price fixed would be for supply by the Companies?—Of course, if the consumer could better himself, he would be at liberty to do so.

Then there could be no harm in the Committee coming in as suggested?—The consumer, of course, would be at liberty, if he wished, to make his own contract.

Mr. LEIGHTON said he took it that the Board of Trade did not approve of the first part of the recommendation of the Committee of last year. Could the witness say if the Board agreed to the other part of the recommendation?

Witness did not think he could go into that at the present moment.

Mr. DANCKWERTS said he hardly understood that anyone differed from the findings of the Committee.

Mr. LEIGHTON: But Sir Courtenay Boyle says he differs from Recommendation No. 3.

Mr. WORSLEY TAYLOR said that, on behalf of the County Council, he wished to observe that he had an opportunity of saying a word to his clients; but the matter seemed to him to have entered on a new phase. Till this morning, they had had before them the Bill of the County Council attempting to deal with the matter on uniform lines, and a measure brought forward by one of the Gas Companies in their own interest. They had heard the views of the Gaslight and Coke Company, and, for the first time, the views of the Commercial Gas Company; and there seemed to be a great deal of agreement between them and the County Council. It seemed to him that this part of the County Council Bill should satisfy everyone, because it was agreed that the prepayment system was an increasing system in the hands of all three Companies. The Bill affected a poor class, who were not able to take the necessary measures for their own protection. The practice of all the Companies was to let the meters and fittings together as a whole; and it was agreed that some regulation of the amount to be paid was desirable, in the interest of the consumer, and that there should be uniformity of charge all over the Metropolis. Under these circumstances, his learned friends had criticized the Bill; and it had been suggested that a *modus vivendi* could be arrived at if the Companies were to meet the County Council, and settle the matter. If this was the suggestion, it seemed to him that its adoption would be of great advantage. The consumer, as represented by the County Council, should meet the Companies.

Mr. NICOL: With the Board of Trade?

Mr. WORSLEY TAYLOR: Yes; if that is the proposal, the County Council would be ready to fall in with it.

Mr. NICOL: Would that mean a fresh Bill?

Mr. WORSLEY TAYLOR said he did not know that the matter could be dealt with at once. He did not say that it could not; but he was afraid that the negotiations would take so much time that the result could not be dealt with. It might involve the withdrawal of the slot powers from the County Council Bill, and the withdrawal of the South Metropolitan Bill. He put it whether it was not worth while to meet, and endeavour to arrive at some agreement.

Witness said if the Committee thought any advantage would accrue from a conference between the representatives of the County Council and the Gas Companies, he should be very glad to invite such a conference, to see if they could not arrive at a conclusion.

Mr. DANCKWERTS: I am sure that will be agreed to by everybody. What I suggest is that the Board of Trade should select some really practical man who can go into the question—I myself have a scheme ready—to settle the thing on broad, sensible lines.

Mr. NICOL: Have the County Council approached your Company with reference to the scheme they have?

Mr. DANCKWERTS: No. The County Council could have such representation on this proposed Commission as the Board of Trade think fit.

The CHAIRMAN: On the other hand, the Committee had before them, or will have before them, the Bill of the South Metropolitan Company, in which they suggest a settlement under one of their clauses.

Mr. DANCKWERTS: Mr. Livesey is here; and he tells me he is perfectly willing to stand in with all the Companies.

The CHAIRMAN: I see Mr. Livesey shaking his head.

Mr. LIVESEY: I think it can be done much more easily than that.

The CHAIRMAN: At all events, we have the goodwill of the Board of Trade. Sir Courtenay, I think you said you would convene?

Witness: I said "invite."

Mr. LEIGHTON: You do not propose, Mr. Worsley Taylor, to withdraw your Bill to have a conference?

Mr. WORSLEY TAYLOR: I said I doubted whether legislation would be possible; and in that case, the convenient course would be to withdraw this part of our Bill and the corresponding part of the South Metropolitan Bill—the matter to stand over for a conference under the auspices of the Board of Trade.

Mr. ROSTRON: We should like our Bill to be first heard.

Mr. WORSLEY TAYLOR: I only said this as a means of settling the matter on a friendly basis. Suppose, conceivably, you thought the South Metropolitan was a better proposal than the County Council Bill, you would be legislating for only one. Therefore for the other two, supposing you settled that, you could decide nothing—there would have to be fresh legislation next year.

Mr. DANCKWERTS: For once, I am in cordial agreement with what my learned friend has said. It is extremely advantageous that the legislation should be, not upon the discussion of one single proposal before the Committee, but upon all possible proposals that can be made.

Mr. WORSLEY TAYLOR: That is another advantage, it seems to me, of a conference of this kind. The Board of Trade might be able to suggest something, and so might the Commercial and the Gaslight and Coke Companies.

Mr. NICOL: What is left of your Bill? We threw out the preamble of the first part?

Mr. WORSLEY TAYLOR: This is the remaining part of the Bill.

Mr. NICOL: This conference may last till the Greek Kalends.

Mr. LEIGHTON: You propose to withdraw the Bill for this year?

Mr. WORSLEY TAYLOR: I should like to have an opportunity of considering that—to see whether legislation would be practicable this year. Uniform legislation could clearly only come about under the Bill of the County Council, because it is the only Bill which deals with all three Companies.

Mr. DANCKWERTS: Or by Public Bill.

Mr. WORSLEY TAYLOR; Would this be convenient—simply to suspend the further consideration of this part of these two Bills for the present, and see whether anything could be done in the meantime with a view to legislation this session?

Mr. DANCKWERTS: That is the precedent of 1876. Then all the parties met, and agreed upon a form of Bill; and it was settled that it should go through as an unopposed Bill. That might even be done this session, by suspending the Standing Orders, or something of that sort.

Mr. WORSLEY TAYLOR: I think if a uniform result can be arrived at by agreement, it will be better.

The CHAIRMAN: Would it be possible for the three Companies to consult, and also the promoters of the Bill now before the Committee, and arrive at some practical conclusion by (say) to-morrow?

Mr. DANCKWERTS: No; that is impossible. Twenty-four hours is hardly enough to think out a good scheme.

The CHAIRMAN: I—and the Committee agree—think it would be better if we could arrive at some definite conclusion which would apply to all the Companies in the Metropolis; and therefore it seems to us that the best plan would be for all the parties concerned to confer with a view to arriving at a satisfactory conclusion to be made applicable to all.

Mr. NICOL: We have dealt with a portion of the Gaslight and Coke Company's Bill; and we held over our decision on that matter until we took up the second part of the London County Council Bill—that is, the slot-meter part. Why could we not go on with the South Metropolitan Bill, hold over our decision in regard to this question, and then see how we stand when we have heard their case?

The CHAIRMAN: I think that is a very good suggestion. It is one which will not entail inactivity on the part of the Committee. We can go on with the South Metropolitan Bill. We are very anxious to get the Bill through.

Mr. DANCKWERTS: The Committee will remember that if a scheme is agreed upon, it will come before the Committee as an unopposed proposal; and that if, on the other hand, the Committee force us to do the thing in a short period, there may be failure to come to an agreement, and we may have the fight over again.

The CHAIRMAN said they had the suggestion that the Board of Trade would use their influence in securing a conference; and with a conference of that sort, the Committee thought a settlement could be arrived at in such time as would be covered by the hearing of the South Metropolitan Bill.

Mr. DANCKWERTS: I am afraid that is too sanguine.

Mr. NICOL: But we could go on with the South Metropolitan Bill.

Witness suggested to the Committee that the County Council Bill might be a more useful way of dealing with the matter than by individual Bills. If the Committee could use the machinery of the County Council Bill to get a parliamentary decision upon the proposal, it might be convenient to both parties.

Mr. DANCKWERTS said his observations were only in regard to the slot-meter part of the South Metropolitan Bill.

Mr. NICOL: The conference will be in reference to matters dealt with by the Bill of the County Council now before the Committee.

The CHAIRMAN: And specifically that they deal with the difficulty arising on the fittings.

Witness did not think the Board of Trade would invite such a conference, unless something in the shape of a recommendation came from the Committee. If such a recommendation came from the Committee, he was certain an attempt would be made to hold such a conference; and the terms of invitation he had in mind were to consider the method of charge for prepayment meters, and whether it is possible to arrive at any regulation.

Lord R. CECIL said his Company had a scheme which they were very anxious to submit to the Committee.

Mr. DANCKWERTS: Let us proceed with an open mind all round.

Mr. BAGGALLAY: May I say the Commercial Company would be very willing to attend such a conference as Sir Courtenay Boyle has suggested, in order to see whether some uniform mode of dealing with the matter might be discovered? With regard to what Lord R. Cecil says on the part of the South Metropolitan Company, I should have thought that if his system is really a workable one, it might be adopted; but it would be a good opportunity for it to be submitted at the conference. In the meantime, the Committee could go on with the other part of the South Metropolitan Bill.

The CHAIRMAN: Then we will suspend the hearing of the Bill for the day, and take up the South Metropolitan Bill in the meantime—relying upon the parties concerned to use the good offices of Sir Courtenay Boyle to arrive at a settlement.

This terminated the proceedings for the day on the Bill of the London County Council.

The determination of the Committee was announced on Friday—see *ante*, p. 1369.

The London County Council and their Wasteful Parliamentary Expenditure.—A correspondent (signing "E") in the "Standard" last week wrote: "I am not a Parliamentary Agent, or a Parliamentary Counsel, or an expert witness. I am a ratepayer. I do not revel in the parliamentary struggles between the London County Council and the Gas and Water Companies. I only know that, whichever side wins, I have nothing to gain, I have only to pay. *Delirant reges plectuntur Achivi.* For some years past the London County Council have tilted desperately against the Water Companies; but the wisdom of Parliament has been against them. This year they have made an onslaught on the Gas Companies, with the like result. I have sometimes peeped into the parliamentary committee-rooms where these fights have been raging, and have ruefully remarked the array of prosperous-looking warriors engaged on either side. It was sport to them; but it was death to me, for the public has to pay the bill. Will some obliging member of Parliament move for a return of the expenditure in recent years of the London County Council in futile parliamentary campaigns, and of the expenditure incurred by their opponents? And may a plain man suggest that a public authority who shall fail to convince Parliament of the merits of their aspirations, should be required to obtain the sanction of the Board of Trade or Local Government Board before they may fight the same fight over again?"

HOUSE OF COMMONS COMMITTEE.

Monday, May 14.

(*Before Mr.* MARK OLDROYD, *Chairman, Mr.* EMMOTT, *Mr.* NICOL, *and Mr.* STANLEY LEIGHTON.)

SOUTH METROPOLITAN GAS BILL.

On the suspension of the proceedings in regard to Part III. of the London County Council Bill to-day, the Committee proceeded to consider the Bill of the South Metropolitan Gas Company.

Mr. BALFOUR BROWNE, Q.C., Lord ROBERT CECIL, Q.C., and Mr. ROSTRON were for the promoters. The other Counsel engaged were: Mr. F. R. FITZGERALD, for the Ecclesiastical Commissioners; Mr. FREEMAN, Q.C., and Mr. G. J. TALBOT, for the Vestries of Camberwell, Rotherhithe, Battersea, Bermondsey, and Newington; Mr. WORSLEY TAYLOR, Q.C., Mr. FREEMAN, Q.C., and Mr. G. J. TALBOT, for the London County Council; Mr. CORRIE GRANT, for the Vestry of St. George, Southwark; and Mr. LITTLER, Q.C., and Mr. RIGG, for the Corporation of the City of London.

Mr. BALFOUR BROWNE, in opening, drew attention to the Instruction to the Committee on the Bill, to consider whether it was desirable to insert such clauses as might be required to give effect to Recommendations Nos. 1 and 2 of the Select Committee of last year. The first recommendation was: "That, whenever any of the Metropolitan Gas Companies again come to Parliament for an extension or alteration of their capital powers, a revision of the sliding-scale should take place, and that the standard price should be reduced to 3s. 3d. to carry the standard dividend of 10 per cent., and that the existing scale of increase and decrease of dividend of ¼ per cent. for every penny of increase or decrease of price below or above 3s. 3d. be maintained, and that a secondary or additional scale be imposed, which should permit of an increase or decrease of dividend over and above that regulated by the present scale of ¼ per cent. for every complete 3d. of decrease or increase below or above the standard price of 3s. 3d." The Company had adopted that in their Bill. The second recommendation was that the area south of the Thames, at present part of the district of the Gaslight and Coke Company, should be transferred by them to the South Metropolitan Company at a fair and reasonable price. That, also, the South Metropolitan Company were willing to adopt; and the Bill provided for it. The first recommendation the Company could adopt without doing any harm to their shareholders; but any such recommendation as was contained in the fourth paragraph, with regard to touching the sliding-scale, so as to affect the security upon which people had subscribed their capital, they could not accept any more than the Gaslight and Coke Company. On the existing price of 2s. 1d., present regulations would allow of a dividend of 14 per cent., or on the converted capital of £5 12s. per cent. The suggested rule of a double sliding-scale would allow the Company to divide 14¼ per cent., or £5 14s. per cent. as against £5 12s. That recommendation, therefore, did not allow of the cheating of those persons who had subscribed to the capital of the Company or bought stock at a premium; it gave them a little more. In the case of the Gaslight and Coke Company, the effect would be a loss of 10s. per cent., which would be very unfair, because the premiums on the capital were obtained on the supposition that they were to get that 10s. per cent. It was true there was a lowering of the standard price in the Lea Bridge case; but under perfectly exceptional circumstances. There the sliding-scale was not one on which they had raised any money. It would be a monstrous thing if people were invited to subscribe to the capital of a Company, believing that they might get an increase of dividend to a certain amount, and then to have the chance of that increase removed. Parliament had never done such a thing. If he understood the fourth recommendation, it was to reduce the interest on the old capital. Parliament had reduced the dividend on new capital from time to time, but never on old capital. If the recommendation meant a reduction of dividend on old capital, it would be confiscation; but he did not think that was the meaning, because earlier in the report the Committee said they thought the time had come when the standard price might be reduced on the ground that the cost of gas production had been reduced, and also—and this was important—because capital could now be obtained at a much less rate of interest than formerly. That must apply to new capital. It could not refer to past capital obtained on an old rate of interest; and therefore he took it that the Committee meant that a new standard price might be put upon new, but not upon old, capital. Recommendation No. 1 was not contrary to the principles of the sliding-scale at all; it was perfectly fair and honest, and therefore the Company were prepared to adopt it.

The CHAIRMAN: Although the application of Recommendation No. 1 to your Company would be emphatically beneficial to a small degree, it would be derogatory to the interests of the present shareholders in the Gaslight and Coke Company.

Mr. BALFOUR BROWNE: Certainly.

Mr. NEVILLE: Two millions of capital lost to us.

Mr. BALFOUR BROWNE: That is, by taking off 10s. per cent., their stock would be depreciated by two millions of money.

The CHAIRMAN: Was not that circumstance before the mind of the Committee when they signed the report?

Mr. BALFOUR BROWNE: I cannot think so. I cannot think that the Committee intended absolutely to write off two millions of the capital of a Company who had been authorized by Parliament.

Mr. NEVILLE: I do not think there is any evidence to that effect in the report. There was only one suggestion of the kind, which was from Mr. Haward, who was not a practical man.

The CHAIRMAN asked whether there was not a suspicion in the mind of the Committee that the Gaslight and Coke Company had not been very prompt in adopting modern methods of production, and whether they had not done this in rather a primitive way.

Mr. NEVILLE said the Company were between the devil and the deep sea, because they said the Company was over-capitalized, and therefore charged a high price, and then they inquired why the Company did not come for more capital with which to adopt labour-saving appliances.

Mr. BALFOUR BROWNE said the over-capitalization, as he understood, arose from amalgamation. Suppose it did. Every amalgamation was sanctioned by Parliament; and the mismanagement—if there was mis-

management—therefore was partly that of Parliament. Would anybody say shareholders were to be mulcted of two millions of stock, because there had been some want of labour-saving appliances in the making of gas?

The CHAIRMAN: As a rule shareholders suffer through those who mismanage the affairs of a company.

Mr. BALFOUR BROWNE said he thought that was so—automatically, by the reduction in dividend. The first proposal of the Select Committee, however, did not affect the South Metropolitan Company.

Mr. EMMOTT: If you have to raise your price to 2s. 9d., it will reduce the dividend you have to pay?

Mr. BALFOUR BROWNE: Yes.

The CHAIRMAN: The effect of this double sliding-scale is this: When gas is dear your dividend will be a little less; when it is cheap it will be a little more.

Mr. BALFOUR BROWNE: That is it exactly. Continuing, he said, with regard to the proposal as to the five years, every weight of unremunerative capital hung round the neck of a company had to be borne by the consumer; and having to come to Parliament every five years was a provision weighing down a concern like the South Metropolitan Company. He did not say it was not a right thing that Companies should come to Parliament occasionally; but he deprecated fixing so short a time as five years, because it meant very great expense. With regard to the recommendation of the Select Committee with reference to the sinking fund, he said if they did redeem capital in this way the Company would be merely taking money out of the pockets of the consumers of gas to-day to relieve consumers hereafter. As a fact, he believed there was here very little obsolete capital to be redeemed. Clause V. introduced a new principle, because it relieved the Company of the obligation to supply 16-candle power gas, and directed them to supply such gas (and unenriched) as Newcastle coal produced.

Mr. NICOL: Do you mean this 14-candle power—a reduction of 2 candles—entirely for the South Metropolitan Company?

Mr. BALFOUR BROWNE: Entirely for the South Metropolitan Company. It cannot affect any other Company. He thought he could show that the proposal would be an advantage for the consumers. The money saved would not go to the Company, but to the consumers; so that for the the Company it meant no pecuniary benefit. The Company held that the public wanted not gas of high illuminating power, but cheap gas. During eight months of the year, 50 per cent. of the Company's gas was used not for illumination, but for heating; and for heating, enrichment was mere silliness. The illuminating power of gas was entirely in the consumer's hands, because it depended on the burner used. With a Welsbach burner, for instance, he could get 20-candle illuminating power out of 14-candle gas; and for this purpose the 14-candle gas was better than the 16-candle power, because they wanted heat and not light to get the incandescence. It was proposed that the Company should have power to charge 3s. 3d. for 16-candle gas, 3s. 2d. if they supplied 15-candle gas, and 3s. 1d. if they supplied 14-candle gas. Of course, only one class of gas would be supplied. The question was whether the new principle was sound. Part III. related to the slot-meter, which had been the very greatest boon to gas companies, having induced people to take gas who never would have taken it before. Desiring to encourage people to take as many of these meters as they could, they wanted to supply them at the lowest possible price—looking for their profit, not from the meters, but from the gas passing through them. The proposition, therefore, was to charge for the meters an amount which would cover only the interest on the cost, the repairs, the depreciation or renewals, and a fair allowance for management. The railway contemplated in the Bill was to be public for goods, and the South-Eastern Company were to work it; the object being to take coal more cheaply into the works and to get coke away, thus avoiding an immense amount of cartage. The fifth part of the Bill was for the purchase of the Gaslight and Coke Company's area south of the Thames. The Companies so far had been unable to agree as to price. The South Metropolitan Company were perfectly willing to purchase the works and take over the supply of the district; but the Committee would agree, he believed, that they should not pay such a price as would put a burden upon their present district greater than that which it was at present bearing—that was to say, that the people at present being supplied should not be made to pay for people they were to supply in the future. It might be said that they could go to arbitration; but he did not like arbitration, because the price to be paid for expropriating such a Company as the Gaslight and Coke Company must be very great. If the South Metropolitan Company had to pay for prospective value, the result would be a distinct burden. He hoped the two Companies would be able to arrive at an arrangement mutually advantageous to both. With regard to the petitions against the Bill, the Ecclesiastical Commissioners referred to the proposed railway, 53 chains in length, declaring that it would intersect their property, and cut off access to the southern part of the same. In reply to that, he pointed out that the petitioners could go before the Justices and get compensation works carried out, or get severance damages. Moreover, the land would be taken under the Lands Clauses Acts, which would give the petitioners all the protection to which they were entitled.

Mr. FITZGERALD, interposing, said that an agreement was in course of preparation between the Ecclesiastical Commissioners and the promoters, so that for the present the case of the former might be held over.

Mr. BALFOUR BROWNE then dealt with the petition of the London County Council. They objected to the reduction in the illuminating power of the Company's gas, and said that if any alteration were made, it should apply to all the London Gas Companies. He pointed out that it would be impossible for his clients to direct the action of the other Gas Companies. That had never been done in any of the Bills which either of the Companies had passed. Besides, there would be no interference with uniformity, as the whole of the south of London would be under the same law. If the alteration proposed was right, it did not matter to him who invented it. It was sufficient for him that it was good; and the Committee, he hoped, would pass it. As to the petition of the Corporation, they held that the proposals of the Bill would be taken as a precedent for the Gaslight and Coke Company. In this matter, the Corporation was "a Free Stater"—not having anything to complain of itself, but fearing that the example to be set would be followed by another Company; and in the case of the purchase of the Gaslight and Coke Company's property south of the Thames, the petitioners considered that it would remove a plea they had against the Gaslight and Coke Company for reduction in the price of gas north of the Thames. No doubt it would; and in all probability that point was in the mind of Sir J. Rankin's Committee when they recommended the purchase. But he submitted that this question did not affect the South Metropolitan Company, who were not responsible for the Gaslight and Coke Company or their charges. The Vestries and District Boards south of the Thames also petitioned against the Bill, and objected to having varying charges in their districts, and to the Gas Company having power to supply gas of varying qualities. This was evidently the outcome of misapprehension. These authorities would no doubt agree with the Gas Company that the great desideratum was the supply of cheap gas to the public.

Mr. *George Livesey*, examined by Mr. ROSTRON.

Witness said he was Chairman of the South Metropolitan Gas Company. He was the originator of the present sliding-scale, which was founded on identity of interest between the consumer and the gas company; and it had worked well in his district. It was becoming almost inoperative, according to Mr. Haward, as the benefit to the Company of the reduction in the price of gas by a penny was so small. It gave the consumers £42,000, but the Gas Company only got £5600. This was a smaller proportion than the Company had secured originally, when the scale was fixed. This was why a revision of the scale was proposed—to bring the condition of things back to what it was originally. They desired to fall in with the recommendation of the able Committee of last year. The following table would show what would be the effect of the Company's proposal:—

TABLE *Showing the Effect of the Various Sliding-Scales and Initial Prices on the Company's Dividend.*

SLIDING-SCALES.

Price of Gas.	1876. With 3s. 6d. Initial Price.	1899. Committee 3s. 3d. Initial and Secondary Sliding-Scale.	THE COMPANY'S PROPOSALS. Initial Price to be 3s. 3d. for 16-Candle Gas, and to fall One Penny for each Candle.		
			16 Candles and over. 3s. 3d.	15 and under 16 Candles. 3s. 2d.	14 and under 15 Candles. 3s. 1d.
s. d.	Per Cent. £ s. d.	Per Cent. £ s. d.	Per Cent. £ s. d.	Per Cent. £ s. d.	Per Cent. £ s. d.
3 6	4 0 0	3 12 0	3 12 0	3 9 4	3 6 8
3 5	4 2 0	3 16 0	3 14 8	3 12 0	3 9 4
3 4	4 4 0	3 18 0	3 17 4	3 14 8	3 12 0
3 3	4 6 0	4 0 0	4 0 0	3 17 4	3 14 8
3 2	4 8 0	4 2 0	4 2 8	4 0 0	3 17 4
3 1	4 10 0	4 4 0	4 5 4	4 2 8	4 0 0
3 0	4 12 0	4 8 0	4 8 0	4 5 4	4 2 8
2 11	4 14 0	4 10 0	4 10 8	4 8 0	4 5 4
2 10	4 16 0	4 12 0	4 13 4	4 10 8	4 8 0
2 9	4 18 0	4 16 0	4 16 0	4 13 4	4 10 8
2 8	5 0 0	4 18 0	4 18 8	4 16 0	4 13 4
2 7	5 2 0	5 0 0	5 1 4	4 18 8	4 16 0
2 6	5 4 0	5 4 0	5 4 0	5 1 4	4 18 8
2 5	5 6 0	5 6 0	5 6 8	5 4 0	5 1 4
2 4	5 8 0	5 8 0	5 9 4	5 6 8	5 4 0
2 3	5 10 0	5 12 0	5 12 0	5 9 4	5 6 8
2 2	5 12 0	5 14 0	5 14 8	5 12 0	5 9 4
2 1	5 14 0	5 16 0	5 17 4	5 14 8	5 12 0
2 0	5 16 0	6 0 0	6 0 0	5 17 4	5 14 8
1 11	..	..	..	6 0 0	5 17 4
1 10	..	..	..	..	6 0 0

2s. per cent. amounts to £5642 a Year on the Dividend; 2s. 8d. per cent. to £7522.

With regard to the proposal of the Company for the reduction of the illuminating power of their gas, witness pointed out that, when the original standard was fixed, the conditions were very different to those now prevailing. The illuminants in common use, besides gas, were of very low power; and cannel coal was comparatively plentiful. There was now four times as much gas used in London as in 1870. Moreover, some of the best seams of cannel coal had been worked out. The increase in the cost of this coal had forced manufacturers to search for other means of enrichment. More enrichment was required now than formerly, owing to the ordinary coal producing less illumination; and the enriching materials were less satisfactory. Petroleum spirit would not reach well over a large district; and carburetted water gas was unpopular with the public owing to its poisonous quality. His view was that it should be made possible for Gas Companies to use an inferior quality of coal. If they were compelled to go on using gas coal, its price would rise in the market, just as that of cannel coal had. Witness enumerated the methods of illumination which had come into use since 1870, including acetylene, which he considered would become more popular in the future.

The CHAIRMAN: For your information, I may tell you that I have had an installation of acetylene which has displaced gas.

Witness (continuing) said that in the district of his Company there were a large number of gas-stoves and gas-engines. He estimated that during eight or nine months in the year 75 per cent. of the gas manufactured by his Company was used for heating purposes. He pointed out that, when applied to the incandescent burner, 14-candle gas was more effective than gas of higher illuminating power. Having referred to the improved gas-burners and appliances invented in recent years, he said that it was clearly shown that what the consumer wanted was cheap gas. They said to the consumer: "We will give you 14-candle gas, and show you how to use it—show you that, by proper means of lighting it, you can get more light than you get with 16-candle gas."

The CHAIRMAN: Why do you not propose to reduce the illumination below 14 candles?

Witness: Because we think that is as much as Parliament will swallow at once. When we have educated the consumers to the use of that gas, we may propose a further reduction in the illuminating power. Witness

said he imagined that before long there would be an enormous development in the use of the incandescent gas-light—when, as in Germany, a burner could be procured for 1s., and a mantle for 2d.

How long have the patents to run?—About seven years, I think; but there is reason to believe that the light will be rendered very popular before long. The gas consumer, like the average Englishman in other things, was very conservative, and required educating in connection with these matters. Witness denied that there was any cause for alarm on the score of the Company supplying 17-candle gas in one district and 14-candle gas in another.

You are not making this proposal for 14-candle gas as a hard-and-fast rule, under which the consumer will only get 14-candle gas; but your object is rather to find the point at which you can supply the public with gas—whether 14 or 15 candle power—without enrichment?—Yes.

It is the enrichment you are trying to avoid?—Yes. I hold it to be a great mistake.

Examination continued: With regard to slot-meters, the Company would put in a clause which fixed a maximum of 9d. per 1000 cubic feet as the charge for meters, stoves, fittings, &c., which was what they had been charging. He held that the Company ought to supply the slot-meter consumer with gas at the same price as the ordinary consumer, although the slot-meter consumers burnt only about one-fourth of what the ordinary consumers did. The extra cost to the slot-meter consumer was merely to pay for the slot-meter and fittings put into the consumers' houses. The Companies were allowed, by Act of Parliament, to charge 10 per cent. as rent of meters, which 10 per cent. covered the interest on capital and cost of repair, maintenance, and renewal. If there was to be any legislation for slot-meters, the precedent in regard to ordinary meters ought to be taken, and the Companies allowed to charge 10 per cent. on the cost of the meters, stoves, &c. The proper way was to say that the Company should not charge more than 10 per cent. on the cost; that this should be distributed over the average quantity used; and then that the Official Auditor should certify that the amount was no more than sufficient to pay interest on the capital and to meet the extra cost of administration. Although the figure of 9d. was mentioned in the Bill, it would have to be settled every year. It was absurd to standardize fittings.

Mr. LEIGHTON: Sir Courtenay Boyle thought you could only standardize the meters?

Witness: That is done now.

You propose another form of standardizing, through the Official Auditor, with regard to the cost of the fittings?—No; we should put before the Official Auditor the average cost of the fittings. Ten per cent. on that is so much; and he is to see that we have not charged more than the 10 per cent.

Sir C. Boyle said they could not deal with the fittings?—They cannot standardize them.

The payment for the fittings would be a statutory payment under the Official Auditor?—Yes.

In further examination, witness said he was not very anxious about the railway. He was not sure it would be an advantage. With regard to the purchase of the Nine Elms works of the Gaslight and Coke Company, he saw little advantage in it to the South Metropolitan Company, though there would be a gain to the consumers and to the sellers of the works. His Company were willing to take the works if they could get them on terms which would not entail a loss to their shareholders or consumers. There would be no difficulty with regard to the mains; but two-thirds of the gas made at the works supplying the area went over the river, so that the mains crossing the river would be of no use. The South Metropolitan Company had offered as high a price as, in the interests of the shareholders, they could afford. They offered £800,000; and the Gaslight Company asked £1,250,000. The South Metropolitan Company took the profit per 1000 cubic feet the Gaslight and Coke Company had been earning south of the Thames in 1898, which came to a little over 5d., or an aggregate of £21,000 a year. This would pay interest (at 3½ per cent., the rate at which they expected to raise the capital) on £600,000. Then there were the surplus works, which were capable of making a certain quantity of gas. It was found that to extend their works at East Greenwich to make an equal quantity of gas would cost £150,000, which they called £200,000—thus arriving at the £800,000.

Mr. ROSTRON: You are not disposed to accept an arbitration clause on this subject?

Witness: No; we are better judges of what it is worth than any Arbitrators. I think we went beyond our limits. The Company took permissive power; so that if at any time they found it to their advantage to sell the district and came to terms, they could do so.

The CHAIRMAN: Would an enabling clause like that give power to the Company to sell?

Mr. NEVILLE: We have power to sell, under the Metropolis Gas Act. This Bill is really not required.

Witness: It is necessary for us in this sense—that we could not raise the capital.

Mr. NEVILLE: It is not necessary for us.

Witness, in further examination, said it was also proposed to alter the form of accounts. The accounts at present were so set out that no one could tell the amount of capital on which they paid dividend or interest; and the alteration would make this clear.

Cross-examined by Mr. LITTLER: At present the Gaslight and Coke Company were required to supply gas for public lighting in the City at the lowest price at which they supplied any consumer; and gas was sold by that Company at a lower price south than north of the Thames. He agreed that if the Bill made no special provision, and the transfer of the area south of the Thames of the Gaslight Company took place, the City would lose the benefit of receiving gas at the lower price; but it was not fair that the public consumer should be supplied at a lower rate than the private consumer.

By Mr. FREEMAN: The same would apply to the whole of the Authorities north of the Thames. The result was that these Authorities were paying only 2s. 1d. per 1000 cubic feet, although the private consumer paid 3s.; but the private consumer paid too much. There was at present an absolutely uniform standard of candle power over London; but it would be a great advantage to alter it—at any rate, for the sake of experiment. In this case, it would be a most interesting experiment to try the effect of a reduction of illuminating power. It could not injure consumers north of the Thames. The Company would be quite prepared to alter the burners of the consumers, if they wished it, or if it were necessary, in consequence of the reduction in illuminating power. It would be distinctly to the advantage of the consumer to be supplied with lower quality gas; and he believed it would be shown that more light could be obtained from 14-candle gas with a change of burner than was now being obtained from 16-candle gas. The Widnes experiments, in which the quality of gas was reduced by drawing in air, were most unreliable. If Mr. Dibdin was right in suggesting that the reduction from 16 to 15 candle power was equivalent to 5d., it was absurd to talk of reducing the illuminating power. But Mr. Dibdin was not right. He was simply an experimenter, who had had nothing whatever to do with gas manufacture or distribution. The County Council knew nothing about what consumers wanted; the Company did. Moreover, the County Council did not care about them. Like Mr. Littler, who represented the City, they did not care about the consumers one snap. His Company did; they lived by them, and held it to be to their interest to do the best they could for them. He contended that his Company had been the consumers' friend. It was an impossibility that the Companies should supply varying qualities of gas in different parts of their district, or at different times. He objected to a compulsory clause for the acquisition of the portion of the Gaslight and Coke Company's area, because they did not want the district, and would not accept it on any terms which would be a disadvantage to the consumers. Questioned as to his objection to the Board of Trade having control of the fittings, witness said Sir Courtenay Boyle had told them that nothing should induce him to undertake it. The Board of Trade could not do it. How could anyone make the consumer use the fittings the Board of Trade standardized? The Companies supplied fittings with which the consumers were satisfied; and it was open to the consumers to get them elsewhere.

Tuesday, May 15.

Mr. *Livesey*, in cross-examination by Mr. CORRIE GRANT, said he had not the details of the winter consumption of gas in the Company's district; but he would get them.

Mr. CORRIE GRANT said he wanted the total consumption of gas, divided into lighting and heating.

Witness: Then you cannot have it. It is impossible to get it.

In reply to further questions, witness said that in the month of March he assumed that 50 per cent. of the gas consumed was used during the daylight hours—more than in the month of June. He assumed that this would be for purposes other than lighting. An additional 5 per cent. of the public lamps would, before long, use the incandescent mantles. It was not too much to assume that during eight months of the year at least 75 per cent. of the gas supplied was consumed for purposes other than lighting.

Mr. CORRIE GRANT: This is, practically, all assumption.

Witness: No.

Why do you assume that 50 per cent. of the gas used in daylight is not for purposes of lighting?—Well, I do not suppose that many people burn gas in daylight for purposes of lighting.

What I want is the actual consumption during the summer time and the winter time?—There is three times as much gas burnt in January as in June. I will get the figures you want prepared. With regard to the proposed amalgamation, some part of the money spent on gas in the St. George's parish now goes to the Gaslight and Coke Company.

If your purchase is effected, we lose competition in our parish?—The Gaslight and Coke Company are obliged to charge the same amount as the South Metropolitan charge.

Is that not a result of competition—if their price is forced down to the level of yours?—No doubt it is.

Lord R. CECIL (in re-examination): It has been suggested that you might vary the illuminating power of your gas, and supply sometimes 17 and sometimes 14 candle gas. If you supply gas without enrichment, do you suppose that there will be any great variation in the illuminating power?

Witness: No; I assume not. I take it that the consumers will get gas of the quality that the photometer showed when we did not enrich the gas—that is to say, 15-candle gas.

Is there any foundation for the suggestion that you will supply, say, 14-candle gas in January and 17-candle gas in June?—Certainly not. We shall supply gas of the same uniform quality. Probably it will be of a little less quality in January than in June, as the cold weather causes a little condensation.

Are you prepared for the tests to be taken on a monthly instead of a six-monthly average?—Yes. The Bill was drafted for a six months' average, which we take because our accounts are made up half-yearly. But that is not quite a fair way to deal with the matter, because we find that three times as much gas is used in January as in June. We therefore propose to take a monthly test in January, and multiply it by the quality, and the quantity sent out in June, and multiply that by the quality, and then take the average.

If you supply gas from the same coal without enrichment, by the same process, you get substantially the same quality all the year round, do you not?—Yes; with very little variation.

You say one of the chief reasons for passing this Bill is that it will be of great benefit to the consumer?—Yes.

In saying that, you do not pretend to pose as a pure philanthropist?—No. For thirty years we have pursued the policy of trying to satisfy our consumers, and it has answered our purpose. We have held our ground against our opponents, and have secured a much greater increase of business than they. I may say we have got so far as to offer all our stock to consumers. We have told them they can have it on application, at such and such a price.

In other words, it is to your interest to satisfy your customers?—Yes; and we have gone farther than that. We have given our employees an interest in our business in the same ratio. They are paid on a scale corresponding with the price that the gas is sold for. If the price can be reduced, the men benefit.

The CHAIRMAN: As to the proposal to lower the standard of illuminating power, you propose to fix the lowest at 14 candles?

Witness: Yes.

And so on up to 16 candles?—Yes.

And you propose to supply your gas without enrichment for the future?—Yes.

You must have had large experience in dealing with supplies of gas coal—the peculiar class of coal eminently fitted for the making of gas. According to that experience, do you think you will be able to obtain a supply which will secure your ability to furnish gas at any given standard you may adopt—that is to say, of 14, 15, or 16 candle power?—We could work in that direction. We could get our coal and supply gas of the quality it produces, taking care that it does not fall below 14-candle power. We have had coal from one colliery for sixty years. I remember it when I was a boy. But it certainly is not so good now as it was. It is getting more a coking coal than a gas coal. We cannot, in fact, get the coal we want from Durham. Twelve months ago we contracted for 100,000 tons from Lord Londonderry's collieries. We have not got it yet. There is plenty of coal available that will give us 15-candle gas, but very little that will give us gas of 16-candle power.

Mr. LEIGHTON: What security will the public have that you will enrich gas that is below 14-candle power?

Witness: If the coal fails, we shall be obliged to use enrichment.

Mr. NICOL: If the gas depreciates in quality, you will have to come to Parliament again for a further reduction of illuminating power?

Witness: With a new burner.

Mr. NICOL: I do not know about that.

The CHAIRMAN: You have now a margin of ½ candle before you come under penalties?

Witness: Yes. If it were not put in that way, we should be subject to penalty even if the gas fell a tenth of a candle during the first hour of testing. Under the arrangement of 1876, the penalty for the first ½-candle deficiency is 40s. In respect of the first candle deficiency, the penalty is in proportion to the value of the gas, and so on with the succeeding candles. The penalties in respect of 14-candle gas will be the same as those which now apply to 16-candle gas.

Mr. *Thomas Newbigging*, examined by Lord R. CECIL.

Witness said that generally he agreed with Mr. Livesey's evidence. He thought there was a distinct disadvantage in a very high illuminating power to the gas consumer. The enrichment of gas not only costs the consumer more than it is worth, but it introduces an element which aggravates the irregularity of the illuminating power over the district of supply. As a rule, the burners used by the public were not capable of developing the full illuminating power of the gas; and in these circumstances, a variation in the initial quality to the extent of 2 candles would produce no appreciable difference in the illuminating effect. Consumers went on using their burners long after they ceased to give a proper result. It might be desirable; but he did not think Parliament would ever allow a gas company to compel the consumer to use a certain burner. He thought a reduction, within limits, of the initial illuminating power was a desirable thing. In his view, the provisions of the present Bill provided a scheme by which this could be properly, justly, and generously carried out. The suggestion of the South Metropolitan Company was one which it was exceedingly desirable to adopt. If the consumer used an improved incandescent burner, the lower quality gas would make no difference; and with such a burner the high illuminating power of gas was positively objectionable. There was risk under the Bill that the Company would not be sufficiently remunerated. The Company might have to pay the same price for the inferior as they had to pay for the better-class coal; so then it was the Company who was under disability, not the consumer. The Company might have to pay the same price for coal, and yet get less for the gas produced by that coal.

Lord R. CECIL: Can you tell the Committee what your experience is as to complaints of the illuminating power of gas?

Witness: My experience is that in the southern counties, where the illuminating power is fixed at 14 candles, as a rule the complaints are not nearly so numerous. In fact, there is almost an entire absence of complaints in the southern portions of the kingdom, whereas in the north, where the illuminating power ranges from 16 to 20 candles, complaints of bad gas are of daily occurrence. Even in the Metropolis, there are very few complaints by the consumers; the complaints come almost entirely from the Gas Examiners. The reason is that in burning a low-grade gas, you burn it to better advantage than you can burn a higher grade gas, using the same burner.

In other words, the ordinary burner is adapted for the low-grade gas, and not the high-grade gas?—That is so.

You are also of opinion that, where a higher-grade gas is supplied, you do not get such good street lighting?—That is my experience. The street lighting in London, for example, is, I was going to say, perfect. At least, it is very much better with its 16-candle gas, than street lighting I have seen with 18-candle gas. In Edinburgh, where the streets were lighted with gas of 25 or 26 candles, the result was exceedingly unsatisfactory. The consequence was that the Corporation resorted to electric arc lighting. I doubt very much whether they would ever have done so had not the street lighting been notoriously unsatisfactory by reason of the high illuminating power of the gas. The gas had a very high illuminating power, but a very low diffusive power. For the use of gas for purposes other than lighting, the reduction of the initial power by 1 or 2 candles would not have any appreciable effect, and certainly any such difference would be covered by the proposed reduction in price of 1d. The scientific application of gas for purposes other than lighting was in a very crude state; and improvements were being made, and would be made in the future. Low-grade gases, within a certain range, were better for heating purposes than high-grade gases.

Do you regard enrichment as a cause of deterioration in the gas?—Not exactly as a cause of deterioration. Any gas not homogeneous suffers deterioration by condensation when passing through mains—less or more. I believe simple coal gas suffers no deterioration—or but little—in passing through mains.

Generally, I may take it, you are strongly in favour of this Bill?—Yes.

Cross-examined by Mr. WORSLEY TAYLOR: Many Scotch managers who laughed at witness three years ago, when he began to advocate lower-candle power gas, were now coming round to his opinion. The proposal of the Bill was introducing no new innovation at all; it simply introduced natural conditions, and would give wider scope in the purchase of coal. He agreed that a large number of the Companies he advised had to supply gas of fixed illuminating power; the average being about 15 candles. The figure with a large number was 16 candles. The Bill was intended for the advantage of both consumers and Company. He had not heard that any consumer had asked for it; but he was not aware that any consumer objected. By the present system, the Company were not able to reduce the price as they would like, which was a hardship. The Company, further, were continually in a state of anxiety, because they were not able to supply, unenriched, the gas made from coal. If the Bill were passed, the result, in his opinion, would be that 15-candle gas would be supplied all the year. It would reduce the illuminating power as tested on the photometer, but not the illuminating effect. The result of giving the Company a margin, and not fixing a hard-and-fast limit to the illuminating power, might be that they would avoid penalties; but it was desirable there should be such a margin. In Edinburgh, he agreed, they burnt 2½ cubic feet of gas per hour in each burner, instead of 5 cubic feet as in London. It was not necessary that there should be a general inquiry before making the changes proposed in the Bill, which might lead to an alteration in standards of illuminating power in London and all over the country. In London, Durham coal was used; but in other parts there was coal which produced 16-candle gas without enrichment, and he would apply the same rule to them as to the London Companies. He would allow them to use the coal without enrichment, which would be no disadvantage to the consumer at all. No doubt, if the Bill were passed, the same proposal could not be refused the Gaslight and Coke Company and the Commercial Company. But there was no uniformity in gas legislation. Even in Lancashire, where the coal was supposed to supply gas of high quality, some Companies were only under obligation to give 12-candle gas. It would be a splendid thing if each Company were under obligation to supply gas of the quality which could be obtained from the coal of the particular district.

Mr. CORRIE GRANT: Does not your proposal come to this—to give the South Metropolitan Company freedom to go to other coalfields, and use coal of inferior quality if they choose?

Witness: Yes; it does.

Lord R. CECIL: Subject to this—that they cannot use any coal which will produce less than 14-candle gas?

Witness: Yes; that is so.

To do away with enrichment is the main object of the Bill, so far as that part of it is concerned?—Yes. The fact that this was the first Bill of the kind, was no reason why it should not pass. One Company must take the initiative in every reform; and he sincerely hoped it would pass, because it would be good for the Company and the consumers.

By Mr. NICOL: Ordinary coal without enrichment would give more uniformity of illumination than coal with enrichment, provided a proper burner was used. Gas of 14-candle power was good enough for any practical purpose. Generally, for illuminating, 14-candle gas would satisfy the consumer, and be better than gas of 16-candle power.

By Mr. EMMOTT: Gas of high candle power, as tested by the photometer, appeared to have a low diffusive power; but he had made no experiments on this point, and his opinion rested therefore on observation and not on scientific investigation. The calorific power of low-grade gas was greater than that of high-grade gas.

By the CHAIRMAN: Many years ago, the usual method of enrichment of gas was by cannel; but the supply of cannel failing, substitutes were used, which, not being homogeneous with the gas, tended to precipitate in certain unfavourable conditions of temperature and friction.

The CHAIRMAN: Therefore the smaller the service-pipe of the individual consumer, the larger the friction in the pipe, and the more precipitation and loss of what had been supplied originally?

Witness: That is so. There is no doubt about that. The skin friction is very great in proportion to the small bulk of gas.

Therefore your theory is that, in the interests of the country generally, Parliament will gradually—if it is wise, at all events—resort to adapting the standard which it imposes to the local conditions of the supply of coal?—I think that is coming.

Do you think the coal supplies now available in the Metropolis are such that the South Metropolitan Company, if the Bill passes, can safely rely upon their ability to supply 14 to 16 candle gas without enrichment?—I do. I will not say quite up to 16; but I would fix the average at about 15, and I have no doubt it would be perfectly uniform.

You do not regard the Bill as a retrograde movement from the standpoint of a gas expert, but rather as a movement of reform?—I do. If passed, it would be a splendid precedent for the country.

Therefore, although you approve of the principle of uniformity as far as the Metropolis is concerned, yet you think the passing of the Bill introducing a breach of uniformity would be a positive advantage?—Yes.

In your judgment the advantage would be such that it would be the precursor to similar steps on the part of other companies?—Yes.

Professor *Vivian B. Lewes*, examined by Mr. ROSTRON.

Witness said he was Chief Superintending Gas Examiner to the Corporation of the City of London; and he attended to give evidence on an order of the Speaker of the House of Commons. He said that in 1894, he read a paper before the Society of Arts, in which he advanced the view that in the manufacture of coal gas Gas Companies should use the coal which they could most economically obtain at their gas-works, retort it in the best possible way, and send out the gas without enrichment. He had seen no reason to alter his opinion in favour of natural as against enriched gas.

Mr. ROSTRON: You think a cheap supply of gas is more useful for the consumer than an enriched gas at a higher price?

Witness: Undoubtedly. My view on the subject of enrichment is that it is money practically thrown away. The old method of enriching with cannel had had to be practically abandoned, because the price became prohibitive; and there was great prejudice against the use of carburetted water gas, because of the increase it involved in the carbon monoxide—a highly poisonous gas. Even with the volatile hydrocarbon method used by the South Metropolitan Company, in cross-mains, dead-ends, and places where stagnation could occur, the artificial illuminating matter in the gas was deposited. This Company had been able to fulfil their parliamentary obligations, because their works were scattered over the district of supply. He approved of the proposal to reduce the standard in London to that of the gas to be obtained from Durham coal.

What are your views as to the reduction of 1d. for each fall of a candle?—I think it is a perfectly just and generous offer on the part of the

Company. Formerly, carburetting oil was at such a price as allowed enrichment to be effected for a little over ½d. per 1000 cubic feet; but now oil had risen to such a point that it costs over 1d. to get one candle of enrichment. With carburine, the figure was 1·12d. The quantity of gas by this method was increased practically nothing. The Bill would assist rather than damage the consumer. Of the gas used in London, 50 per cent. was for heating purposes, 15 per cent. for incandescent mantle lighting, and 35 per cent. for other methods of lighting. He had made experiments with regard to the calorific value of coal gas, and found that, as the candle power fell, so there was a fall in the calorific value. As between 16 and 15 candle gas, there was a loss of 2·4 per cent., and between 15 and 14 candle gas a further loss of about 2·5 per cent. on the total heating value. Comparing this with the reduction in price, there was a gain to the consumer. In connection with incandescent lighting, there was some peculiar phenomena; there being apparently an absolute gain in light by lowering the quality of the gas. The reason was that the air supply in these burners was not regulated for a rich but for a poor gas; so that in a burner where the conditions were for 15-candle gas, a better result was obtained than with 16-candle gas. This would be the case with gas down to 12 candles. Nine consumers out of ten would thus benefit by the lower quality. If a scientific man were to regulate the air supply, he would find the opposite occur.

At the consumer's burner, the quality of the pure coal gas would be almost as good as, and more uniform than, the present gas supplied?—Yes, undoubtedly. The rate of progress of incandescent lighting in this country had been much slower than in other countries. On the Continent, where an incandescent burner could be obtained for a third of the price charged in England, this method of lighting had increased in places to as much as 85 per cent. of the total. In London, it was increasing; the Welsbach burner being much the cheapest, reckoned by cubic feet. The flat-flame burner was totally unfitted for the burning of poor gas. A large number of these burners had two little holes, from which jets of gas were made to rush out and splay themselves. This drew in a large amount of air, which, while good for gas of high quality—say, 22 candles—was not good for gas of any lower quality. The Bill would be decidedly advantageous to the consumer; and it would mark a distinct advance in gas legislation. Paris was as much better illuminated with gas of 14 candles as London, with gas of 16 candles, was better illuminated than Edinburgh, with gas of above 20-candle power.

Cross-examined by Mr. TALBOT: With the best burner, and burning gas rationally, there was a difference of 7 or 8 per cent. between 16 and 15 candle gas. The scheme by which the price of gas rose and fell with the illuminating power, rested on the hypothesis that a penny was fair compensation to the consumer for the loss of a candle in power.

By Mr. NICOL: Temperature affected natural gas much less than enriched gas; so that the difficulty with regard to temperature would be avoided by using natural gas.

Mr. *C. C. Carpenter*, examined by Mr. ROSTRON.

Witness said he was Chief Engineer to the South Metropolitan Gas Company. He explained that the railway proposed in the Bill was to connect the South-Eastern Railway with the Company's East Greenwich works, where it was expected almost all the extension of works necessary to meet the increased demands on the Company would take place. It would enable manufacturing materials to be brought to the works, and coke to be sent out, more cheaply; and it would provide an alternative route to send coal to other works of the Company. The capital expenditure was estimated at £25,000.

Mr. *William Sugg*, examined by Lord R. CECIL.

Witness said 16-candle gas, as ordinarily burnt in London, gave a light, when consumed at the rate of 5 cubic feet per hour, of from 6 to 8 candles—that was, with a union-jet or flat-flame burner. He could supply a burner which, with 14-candle gas, would give as good a result as—perhaps better than—16-candle gas burnt in the present burners. He had heard the Company say they were willing to supply such a burner to their consumers.

By the CHAIRMAN: As a practical manufacturer, he could make a burner which would give the best possible results to any gas which might be supplied to him. Asked why, therefore, any advantage would arise to the consumer from the substitution of the standard of 14 candles for the present standard of 16 candles, witness said with 14-candle gas and a proper burner a brighter result would be obtained than with 16-candle gas. The best burner of all was the argand; but this, he thought, would never be adopted generally.

The CHAIRMAN: Your point is that, to get the best result out of 16-candle gas, you require an argand burner; whereas to get the best results from 14-candle gas, you can use a modification of the present flat-flame burner?

Witness: Yes.

Also that this modification will be readily understood and adopted?—Yes.

And that it is a modification which will prove lasting and enduring?—Yes. The burner was not fragile or easily put out of order; and therefore its adoption was within the compass of rational expectation, without overstraining the intelligence of the general public. If the Company carried out their suggestion, and supplied consumers with the burner best adapted to 14-candle gas, the consumers would see that the results were satisfactory, and equal to those obtained on the present conditions. They would have the advantage of 2d. reduction in the price of gas, and would generally adopt the burner.

SUGG'S PATENT CONED-TOP FLAT-FLAME "VINCENT" GOVERNOR BURNER.

Cross-examined by Mr. WORSLEY TAYLOR: The burner was an improvement on the well-known hollow-top burner, which he brought out some years ago, and was known as the cone-top flat-flame burner.

[Witness handed some samples to the Committee and Counsel, and explained their construction. The head of the burner was hollowed out in an arch over the top, and then cut out in cone-form; the apex of the cone pointing to the bottom of the burner. The gas stood in the burner as it rose from the bottom, and thus there was equal pressure at the top, where it spread itself out, and gave a perfect flame of the very best form. The heat struck downwards, and so warmed the gas, causing it to give light to its full power. With 14-candle gas, it would give better results than the public were getting from 16-candle gas with their present burners. With 16-candle gas in this burner, the result would be better than with 14-candle gas.]

Mr. WORSLEY TAYLOR: Could you get as good a result with 13-candle gas?

Witness: We make burners for 13-candle gas for Paris; but we have not made them yet for this country. I do not think 13-candle gas will give as good a result as 14-candle gas.

You say you get as good a result with 14 as with 16 candle gas?—No. It is a question of the kind of burner you use. You could get a good light with 13 or with 12 candle gas. I have made experiments down to 12-candle gas; but not below it. I have nothing to do with the adoption of 14 candles as the standard. No doubt, 16-candle gas can be improved by my burners, just as 14-candle gas is improved; but, though more brilliant, it would be more smoky, and more liable to be affected by draughts.

Re-examined by Lord R. CECIL: He had turned his attention to these burners, because he had felt certain that before long there would be a reduction made in the illuminating power of the gas. He had worked out a burner which gave the best flame with 16-candle gas. His burner was reckoned to cost about 3d., and would last twenty years; whereas the cheaper burners lasted about 3000 burning hours.

Mr. *W. H. Y. Webber*, examined by Mr. ROSTRON.

Witness said he was a Gas Engineer of upwards of thirty years' experience; and during his connection for the last twenty years with the "JOURNAL," he had studied the course of development of the gas industry both at home and abroad. He had observed that the industry had been changing by stages during the past twenty years, and that it had been very much hurried up of late. Originally gas was only used for lighting by luminous-flame burners—there was nothing else; and the first departure from this was the development of the gas-engine in a commercial form by Otto, in 1876. Then came the rivalry of commercial arc electric lighting, about 1880, which inspired makers of gas apparatus to develop very high-power gas-burners—high-power clusters of flames—in order to compete with the electric arc. This made a market, which did not previously exist, for the regenerative burners of the Siemens type, which were of a high power; and about the same time the use of gas for cooking and heating was brought to comparatively speaking perfection. Finally, the crown was put upon the long course of development by the introduction, from outside, of the incandescent system of gas-burner. He agreed that the demand was now for a cheap gas without special reference to illuminating power. He looked upon the old classical school of photometry as dead. He had studied especially the progress of the gas industry in Germany, where it was necessary to go now if one wished to see the latest triumphs of applied science in the gas industry. Owing to a number of circumstances (the chief of which was the refusal of any master patent for the Welsbach system of gas lighting in the German Empire), and owing to the great industrial development of Germany during the last few years, which, of course, was common knowledge, it might be said that the incandescent system of gas lighting had come into its inheritance in Germany during the last two or three years. In the early days of gas lighting in Germany, it was done by English Companies, and English standards were followed—that was to say, there was a standard of illuminating power varying from 15 to 19 candles. As time went on, and concessions fell in, this practice was dropped. The 19-candle gas, he believed, was still supplied from one or two of the Imperial Continental Gas Association's German stations; but as a rule the statutory illuminating power, if it might be called so, fell to 13½ candles about fifteen years ago. At present, 13-candle gas was practically the German standard.

Mr. ROSTRON: Since that time, a new unit of light has been introduced in Germany?

Witness: The introduction of the Hefner-Alteneck unit of light, which is only 0·877 of an English parliamentary candle, was accepted all over Germany as a candle for photometrical purposes, so that this was a further relief to the gas companies.

The result of that has been to reduce the 13½ legal candles to 11·84 candles?—Yes, about that. From 11 to 12 candle gas where the legal convention of 13 candles is still upheld, as it is in cases where the gas is supplied by companies.

The CHAIRMAN: When the governmental standard was altered to the equivalent of 0·877 to our candle, there was no alteration *pro ratâ?*

Witness: No; none whatever.

Do you mean to imply that the German Government, with its usual enlightenment, saw that a lower standard of light was advantageous for illuminating power, and they took the opportunity of altering their standard in order to get the point without disturbing the prescribed candle power of the different authorities—different companies?—No; I do not think it was quite like that. I think the Professors at the Reichsanstalt—the Technical Institute in Germany—were seeking for a national unit of light. The French had one—the Carcel lamp—which nobody else took to. They have adhered to it for forty years, and are quite content with it now. We have played with standards of lights of all kinds; and nobody has copied us particularly there. The Germans wanted a German national standard of light, and they produced one—Hefner-Alteneck produced one in the form of a lamp burning acetate of amyl. As a matter of fact, they could not make it burn brightly. It is a kind of spirit lamp, with a very feeble red flame; and they could not make it give a higher illuminating power than ⅞ of an English candle. But as soon as it was adopted by the German Government as a German standard of light, all the municipalities took it as an equivalent to the candles with which they were familiar, the practical result of which is that 13-candle gas by English candles came down to between 11 and 12 candles. Expressed in English candles, 11½ is now the German standard.

By Mr. ROSTRON: It was not the practice of all German municipalities to work up to that standard. As soon as a German municipality get hold of the gas-works officially, photometry goes to the winds; and they make the gas from Westphalian coal, which is their natural gas coal, mined in the Ruhr basin of Westphalia. Without carburetting at all, the German coal would naturally make gas running from about 11 to

12 Hefners—that was to say, about 9½ to 10½ English candles. That meant working the coal to the best technical advantage.

Mr. ROSTRON: They refuse to enrich?

Witness: They do not like throwing money away in Germany. They believe in ge ting the utmost value for every pfennig.

I think that Magdeburg is a practical example of the state of things you have been describing?—It has a municipal gas undertaking, which has been the first to adopt the principle of sending out gas just as it comes by the ordinary way of carbonizing from the cheap Westphalian coal. They have done that now for some years. They used to buy English coal, and also to carburet; but they have given all that up.

The CHAIRMAN: Is it black coal or brown?

Witness: Black. It makes a very good coke for their purposes. It is a little soft by our standard; but it suits their closed stoves very well.

By Mr. ROSTRON: Magdeburg had about 250,000 inhabitants, and, like many manufacturing towns, was growing very fast. It was the centre of several industries. Krupp's people had a branch there, and they had electric trams all over the place; but electric lighting was practically obsolete. It had been given up in favour of incandescent gas. It was the most incandescent gas-lit town he ever saw; it was necessary to hunt for a flat-flame burner. The people said they could not afford to use them. This burner was practically obsolete in Germany.

Mr. ROSTRON: What is the relative cost of the incandescent installation in Magdeburg, as compared with London?

Witness: Not more than one-third the average cost. I can show you some burners here, bought in a retail shop in Magdeburg. Here is a Welsbach burner, which I bought over the counter retail for 1 mark. Here is another, which is a superior article, with a lava ring inside. That retails for 1s. 3d. If there is any inflammable material in a shop window, they do not allow them to burn gas in it; so they put a bar across the top of the shop, out of the line of sight, and this bar takes the gas. They will cram the bar with incandescent burners under reflectors. I have counted seventeen in a shop window; and the whole thing will cost the shopkeeper somewhere about 2s. to 2s. 6d. a point. They have a very good system for renewing the incandescent gas mantles. You never see such a thing as a bad mantle or a bad light. They send to the gas-works (there is no monopoly), or to some leading gas-fitter who does these things; and they will come and take away the old mantle and chimney, and everything above the gallery. You buy the mantles wholesale for 2d. each; and they take the whole thing away, chimney and everything else, and replace it and see that it is all right for 60 pfennigs (7½d.).

Mr. NICOL: Some make a contract for the year?

Witness: I daresay they do; but as a rule I think they have them changed by the agent. The consequence is you never see a bad light.

What is the cost of those made in Germany, as compared with ours?—I believe the Welsbach people, who hold the patent monopoly, are contemplating—at least, they have made an announcement—reducing their prices. It would not be safe to say what they will be.

The CHAIRMAN: The burners here cost 3s. 6d. or 4s. 6d.

Mr. EMMOTT: The mantles are 1s. or more each?

Witness: 1s. or 1s. 3d. They buy them wholesale there. The Berlin Welsbach mantles are sold by the thousand at 16 pfennigs apiece, which is about 2d. They are sent out packed like stockings; and they are put in shape at the gas-works. The result is, broadly, that you see nothing else. I can give you the figures of the German Continental Gas Company, of Dessau. They serve about a dozen towns over Germany, from Potsdam to Warsaw; and their increase is very great. I have a record of twelve days' testings of the gas supplied at Magdeburg, with results varying from 12·1 Hefners to as low as 8·5, owing to some accident at the works. The normal range was from 12·1 to 10·7. There is no complaint of bad gas in the town. With regard to securing good lighting results, they do not admit that there is any connection between the illuminating power and the question of bad gas. With ample service-pipes, sufficient pressure, a proper sized meter, suitable house connections, and a good mantle, there is no such thing as bad gas.

By Mr. NICOL: He gave this town as an illustration of the general policy all over Germany. Without the incandescent system, the same results could not be produced with the low-candle gas.

By the CHAIRMAN: There was no obligation on the consumer to adopt the incandescent burner; but he was intelligent.

The CHAIRMAN: He is intelligent enough to see his own interest. You think it would be an advantage, under this Bill, to quicken the intelligence of the British consumer?

Witness: I think that when he can get an incandescent burner complete for a matter of 1s. 6d. or 2s., and he sees very well, even as matters are now, what a splendid light it is, his intelligence will screw him up to the point that he will sooner have 40 or 50 candle power for 3 cubic feet of gas, than go on with the obsolete flat-flame, getting 9 or 10 candle power for the same quantity.

Mr. NICOL: The gas bill is less in amount each quarter?

Witness: Yes. It has put a different complexion on the gas industry in Germany, because, owing to the fact of gas having been a luxury of the rich in bygone times, it has been very dear, and the consumption comparatively small.

Have the Imperial Continental Gas Association a large interest in Germany?—Very large.

Is their policy the same as you have stated with reference to Magdeburg?—They are bound by their existing concessions to supply gas of a certain power, which involves carburetting.

Mr. ROSTRON: I believe you can say something as to the policy of the German Continental Gas Company when the concessions fall in?

Witness: As their concessions with the different cities fall in, they mean to represent to them the example of Magdeburg and Bremen. Of course, when they renew concessions for the lighting of a town, there is a give-and-take; and they propose to follow the example of Magdeburg, and do away with the convention of illuminating power taken by the luminous flame burner, which is obsolete, and to give the consumer as much as they possibly can in reduction of price to make up for it.

What I gather is that when their concessions expire or fall in, they will give the thing a start *de novo*, so to speak. They will take the groundwork you have represented as already adopted at Magdeburg?—Yes.

Which ground-work of a low illuminating power is, according to German scientific knowledge, found to be the best?—The best policy. Instead of charging 5s. 8d. per 1000 cubic feet, they will charge not much more than two-thirds as much and hope to make it pay, though in Magdeburg, as a matter of fact, they have not hitherto been able to make any reduction of price, because their intentions were frustrated by the sudden rise in the price of coal.

Is the rate of consumption increasing in Germany?—Very fast indeed.

The CHAIRMAN: It may do that, and still not be increasing any more than it is here?

Witness: I think relatively it is.

It depends upon the basis upon which the increase is reckoned. A few years ago, everybody used oil-lamps in Germany?—Yes; but 20 per cent. annual gas increases are not uncommon there now.

Mr. ROSTRON: I think you made the experiments to which the diagrams on the wall refer? [The diagrams alluded to were those which accompanied Mr. Livesey's paper read before the recent meeting of the Institution of Gas Engineers, *ante*, p. 1201.]

Witness: No; I made the inquiries about that matter. The experiments were not made for the purpose of this inquiry. They were made by direction of Herr W. von Oechelhaeuser, who is the President of the German Continental Gas Company. They took place last May, in order to ascertain whether it was safe to reduce the illuminating power of the gas—the normal illuminating power—not by putting air or anything of that kind into it, but by taking it from a so-called low-grade coal. In order to do this, they took a sample of their ordinary Dessau gas, which started at 12¾ Hefners; and then they took the calorific power also by the calorimeter. It was a little over 600 British thermal units. They passed this gas from the test holder progressively over animal wool soaked in creosote oil, which has the property of absorbing the benzol. It was originally carburetted with benzol; and they took out all the benzol which they put in, and all the benzol that they could find in the gas. Eventually, they got their illuminating power down to 2 candles—practically a non-luminous gas—and the result on the other qualities of the gas you see here. The incandescent gas-burner was a Welsbach pattern of German make, which had already been in use for 300 hours, so that it had got into its stride; and it was burnt at one uniform rate of gas consumption throughout.

Cross-examined by Mr. WORSLEY TAYLOR: The Companies in Germany supplied gas of 13 Hefners, or about 11½ English candles. When the power was 13 candles, the charge was about the same as now—5s. 8d. per 1000 cubic feet. The people now paid 5s. 8d. for 11½-candle gas.

Mr. WORSLEY TAYLOR: I do not wonder there is some leeway to make up. Shortly, it comes to this: They had a gas they could not do much good with unless they adopted a Welsbach burner. Was not that so?

Witness: I do not think they would take it from you that it was a gas they could not do much with. It is the same as Paris gas. They did a great deal with it before the Welsbach burner came out. That burner was the reason for the increase.

They had a low quality of gas, and the Welsbach burner came, which enabled them to use it?—No; that would not hold good all over Germany, because in certain places they had a very high quality of gas. At Bremen—the Liverpool of North Germany—they had 20 candle gas. The standard varied throughout Germany.

The CHAIRMAN: Do you know whether the variation in standard depended, or was based upon, the supply of coal?

Witness: No, as in England, there was no rational basis for it. The Imperial Continental Gas Association had a great deal to do with introducing gas in Germany; and they took the English standard with them, as a matter of course.

Further cross-examined: If there was to be 14-candle gas, it was desirable to use the burner before the Committee, the cost of which in Germany was about 2s. 6d., against 7s. 6d. in England.

The CHAIRMAN: The witness's suggestion is that, to get the best advantage out of the 14-candle gas, this is the thing to use, whatever it may be in the future. He does not say that he cannot get a better condition of things than now obtains in London, with the 16-candle gas, at a much less cost. We have got Mr. Sugg's burner. Perhaps he does not know about that?

Witness: I look upon the flat flame as an obsolete system.

Mr. WORSLEY TAYLOR: I do not want to go back upon that. (To witness:) What do you suggest is the right illuminating power to be fixed as a standard here in England?

Witness: I suggest—and I have held the point for twenty years—that the right and only sound economic principle is to send out the gas as it can be made to the best technical advantage from the natural coal supply, without carburetting of any kind. If the natural coal supply of London and the south coast is the Durham coal, and that coal will make 15-candle gas tested at the works, when made pure, then I say that that is the natural illuminating power; and you cannot by any possible means either increase or deteriorate it without causing very great unnecessary expense and waste. He agreed that, if the adoption of a lower standard involved the burning of more cubic feet per hour, there ought to be a corresponding reduction in price.

Cross-examined by Mr. CORRIE GRANT: Theoretically the natural standard would involve an alteration every time there was a change in the coalfield; but practically it did not.

Witness: Something has been said regarding burners. I brought this [producing a gas-pendant with incandescent fittings] because I thought perhaps a question might be put to me as to the point that the incandescent system was a delicate system, and a luxury. This is a fitting made in Germany, which I bought; and it was sent over to me retail at 7s. 6d., all complete. I saw a man using a steam-hammer by the light of this thing. It was hung within a foot of his hammer. He puts it to any height he likes. This is a so-called "Gem" incandescent burner, consuming 2½ cubic feet of gas per hour; and they make gas and carry on the work of the factory, and do everything, even on the works themselves, with this. I said: "Do you use these in place of flat-flame burners?" They replied, "Yes; we could not afford to use flat-flame burners." This is absolutely in use. It is not a luxury; and Germany is now where we shall be at a time which the Law Courts will shortly determine.

Lord R. CECIL (in re-examination): Under the proposals of this Bill, will there be, as you understand it, any reduction of the illuminating power in the house of the ordinary consumer?

Witness: Oh, no. He can get what illuminating power he likes.

Mr. WORSLEY TAYLOR: The same burner in each case?

Witness: If it is the same burner in each case, there will be no alteration in the illuminating power, if he uses an incandescent burner.

Lord R. CECIL: Take this case. They get a gas that gives them 8-candle power.

Mr. WORSLEY TAYLOR: With what burner?

Lord R. CECIL: With the existing burner. The Company are prepared to offer them an improved burner that will give them 12-candle power.

The CHAIRMAN: Nominally 14.

Lord R. CECIL: It will increase by the combination of their new burner and their new gas. They will increase really the illuminating power of the gas in the house of the consumer?

Witness: Yes.

In that case, is the fair measure of the reduction the amount of money that the Company save by supplying the lower-power gas?—Clearly. I take it that the Bill proposes to make an allowance.

Mr. LEIGHTON: Is there anything in the Bill about the Company providing burners in the house?

Lord R. CECIL: I think not. It was an offer made by Mr. Livesey, by which we stand.

Mr. LEIGHTON: How does it come into our consideration with regard to the Bill—that is to say, how will it be enforced. It is a great consideration, of course.

Lord R. CECIL: Of course, it is a very important matter. Speaking on the spur of the moment, I do not think there will be any difficulty in drafting a clause to the effect that the Company shall be bound to supply an improved burner to any consumer who asks them for it.

By Mr. NICOL: There were districts in Germany where they had had the electric light, and where, owing to the system of using low-candle power gas in the Welsbach burner, electricity was abandoned. It is so in Berlin.

By the CHAIRMAN: Going back some years, gas was not used as much as in England, largely because of the cost; the price of coal there being relatively much higher than here.

The CHAIRMAN: Then, owing to the excessive cost of coal gas and the development of the electric industry, electricity was largely adopted as being cheaper than gas?

Witness: I would not say that.

Mr. NICOL: Better light?

Witness: It was a better light in some respects than the old flat flame; but you see Germany was the birthplace of Siemens's regenerative gas-burner, as well as of the incandescent system, and it really came into the market contemporaneously with the electric arc lamp.

The CHAIRMAN: It was the dearness of coal, and therefore the dearness of gas, which stimulated the development of the electric light in Germany?

Witness: No doubt.

Now we come to a later stage in the development, when the German people find that they can get so much more luminosity by the Welsbach principle. They say: "Our electric light is dearer than our gas, therefore we go at once, from economical considerations, to the use of gas?"—Yes.

Therefore gas has now become popular, particularly in the form of the incandescent light?—Yes.

To the extent of about 90 per cent. of the whole amount of gas used for illumination?—Yes, certainly that.

Mr. NICOL: Is it your opinion that, so long as the standard of light of 16 candles exists, we shall make no progress on the same lines as Germany has done?

Witness: I would not like to say that, because I do not know when the Welsbach monopoly expires. Certainly 16-candle gas will do very well with the incandescent system; but the cheaper gas will do equally well, if not better.

The CHAIRMAN: I will put it in this way: There will not be as much reduction in price to the consumer of gas of 16-candle power, even with the incandescent light, as there would be with the 14-candle gas?

Witness: Certainly not. It will be as much as the Company can do to make 16-candle gas at any price.

Wednesday, May 16.

At the commencement of to-day's proceedings,

Mr. WORSLEY TAYLOR said there had been some alterations in the Bill as to burners, and giving notice of variation in the gas. He should like to see the exact terms of the alterations.

Lord R. CECIL: I should be very glad to discuss the clauses of the Bill with my learned friend at any time.

Mr. WORSLEY TAYLOR: I desire to see the Bill—the clauses it is proposed to put in.

Lord R. CECIL: I have not got them. I do not know what my learned friend's difficulty is. We have told him what we propose to do; and if he wishes to discuss the clauses now, I am ready.

Mr. WORSLEY TAYLOR: I am not going to be put off in that way. I am entitled to see the Bill as modified.

The CHAIRMAN: The sooner the clauses can be given the better.

Lord R. CECIL: Certainly. I will do what I can to get them.

Dr. *S. Rideal*, examined by Mr. ROSTRON.

Witness had for some years paid attention to the methods employed in the enrichment of gas and in determining its illuminating power. He had been for some time one of the Gas Examiners to the London County Council, and was now employed in that capacity by the Lewisham Board of Works and many other local authorities. He agreed with the views of Mr. Livesey and the other witnesses in connection with the Bill, that enrichment of gas was a very undesirable thing. He said that, in the case of foodstuffs, the Legislature had taken steps to prevent adulteration. For instance, the addition of alcohol to sherry, although it fortified the wine, was regarded as an adulteration; and in the same way the addition of butter to margarine was looked upon as adulteration. What was chiefly desired in the interest of gas consumers was cheap gas, without special regard to illuminating power.

Mr. WORSLEY TAYLOR (in cross-examination): As I understand it, you look upon enrichment as adulteration?

Witness: I do.

Professor *Dewar*, examined by Lord R. CECIL.

Witness said the proposal to get rid of the enriching of gas would be a great advantage to both the public and the Gas Companies.

Lord R. CECIL: That is to say, you fix as your illuminating power such power as you could get from Newcastle coal without enrichment?

Witness: Yes; with the present supply of coal we can get in this country, having regard to the exhaustion of cannel, it would be a great advantage to use the gas unenriched, because undoubtedly it will be more permanent. If it gives 14½ to 15 candles, that is substantially a permanent result—that is, the gas is not liable to deterioration by standing in small mains. The methods of enrichment are more liable to cause inequality.

Do you think that, with a proper burner, any illuminating power between 14 and 16 candles is enough for all ordinary purposes?—Yes; and considering the results that are obtained by the average burner, that would be a suitable illuminating power.

I think you have some records of experiments which may be of service to the Committee?—They are not a complete set; but they are enough to satisfy me of the accuracy of the statement made by Mr. Sugg. I desired to have samples of these burners. I went to Mr. Sugg and picked out two or three of the burners, and tested them with 16-candle gas, and also with 14·5-candle gas, in order to see what was the efficiency or duty of the burner—that is, how many candles per cubic foot of gas consumed you get from two different gases burned with the same or different burners. With the Sugg coned-top flat-flame burner, I found that the efficiency, with 16-candle gas, per cubic foot of gas consumed per hour, was 2·46. There were four of these, and the readings were 2·46, 2·42, 2·41, and 2·48. Then I took one of these governor-burners of Mr. Sugg; and there the result was 2·43. Next I took a Bray No. 4 fishtail; and the efficiency was 1·5. With a Bray No. 6, the efficiency was 1·66. Then I changed to 14·5-candle gas, as tested by the standard; and with the first new Sugg burner the efficiency was 2·62, with a second such burner it was 2·67, and with a third 2·67. This satisfied me that the new burner gives as great an efficiency as can be obtained by the use of 16-candle gas when employed with a consumption of something like 6 or 6½ cubic feet per hour. It proved to me that the burner could produce the same efficiency with 14½-candle gas as with 16-candle gas.

By the CHAIRMAN: The old burner deteriorated very rapidly, because of the nearness of the metal to the flame; but with the new burner there was no metal body near the heat, and consequently the length of time the burner would last was merely a question of the durability of the steatite. He saw no exaggeration in the statement that the old burner was good for 3000 burning hours, and the new one for twenty years.

Further examined by Lord R. CECIL: As regarded heating, the difference produced by a candle or two in the luminosity had no substantial effect. It might be a difference of 2 per cent.; but it was practically not material for incandescent lighting or for heating. So that all the money spent on enriching was wasted. What was wanted was a gas which was of high thermal value, but without being enriched or loaded in any way with mere luminous hydrocarbons.

Mr. WORSLEY TAYLOR (in cross-examination): With 14 or 14½ candle gas, and a better burner, you can get as good a result as now with 16-candle gas and an inferior burner?

Witness: I will not call it necessarily inferior. It depends upon the way in which you burn the gas.

The burner ordinarily in use?—I say you get much greater efficiency with the new burner than with the common burners.

The result to the man who uses the ordinary burner is that he will get the same amount of light as now?—He will get a great deal more; he will get more than 50 per cent. more light.

Do you agree that, if we had 16-candle gas, and adapted your burners to it, we could get a better illuminating result than out of 14-candle gas?—That will depend altogether upon experimental inquiry. I should doubt whether it was so until it was proved.

Assume that it is right—that at present the man who has 16-candle gas can, by using a better burner, get a better result, because he has 16-candle gas, than he can by any possibility get when he is limited to 14 candles. What is the advantage, from the consumer's point of view, of taking away the right which the law gives him?—The answer is that you must look at the average consumption of gas. You must not take the gas of a few isolated persons who use argand burners, and who get the best result. You must take the average result of the use of No. 4 and No. 6 Bray burners. With that, it will be a distinct improvement.

The CHAIRMAN: Mr. Sugg said that, to get the best result with 16-candle gas, an argand burner would be necessary.

Mr. WORSLEY TAYLOR said Mr. Sugg's view was that his 3d. burner would be used with 16-candle gas, and that the consumer could also employ an argand burner. Why should the consumer be deprived of these two advantages?

Witness said that there was no ordinary burner in existence which could be applied in that way to 16-candle gas. Mr. Sugg only said he thought he could produce such a burner—the whole thing was speculative. As to the argand burner, there was only a limited use for it. If the result of the Bill were to be that the consumer would be put to greater expense in getting the amount of illumination he required from 14-candle gas than from 16-candle gas, this would to his mind be wrong; but he could not assent to the hypothesis that this would be the result of the Bill.

For heating purposes, 16-candle gas is slightly better, I understand, than 14-candle gas?—Slightly, owing to the presence of more hydrocarbons in it.

To get the 14½-candle gas to the same heating power, what additional volume will have to be burnt?—I have not calculated it out, but I should say not more than 5 per cent. in the thermal value. Witness went on to say that a large amount of the heat from the burners went to waste up the chimney.

Re-examined by Lord R. CECIL: At present, there was no burner in existence which would give better illumination with 16 than with 14½ candle gas. The benefit given with such a burner was merely a theoretical one; whereas under the Bill, a practical benefit would be given to the consumers at once.

Mr. NICOL asked if the irregularity which existed with 16-candle gas, through the necessity for enrichment, would disappear in the event of the Sugg burner being used.

Witness said the burner would not get over the inequalities in the illuminating power of the gas. The whole question was how to get rid of the difficulties attendant upon the use of enrichment.

Is it your opinion that, as the result of reducing the standard of illumination, the public would get an equally efficient light by using Sugg's burners, and also get a reduction in the price?—Yes. I think the poor would be much better off.

You mean that it costs more to supply 16 than 14 candle gas?—Yes. The saving to the Gas Company would recoup them for supplying the burner to any person who would allow the change to be made. The poor in that way would be benefited.

So that, from a financial point of view, both the consumer and the shareholder benefit?—That is a point I am not capable of speaking on.

The CHAIRMAN: I understand you to say that enrichment at the source of supply gives no guarantee in cold weather that the gas will be of 16-candle power when it reaches the meter of the consumer?

Witness: Tested rigidly, that is undoubtedly the case.

Therefore, in your judgment, so far as regularity is concerned, a rigid adherence to a legalized standard of 14 candles would be preferable to one of 16 candles?—Undoubtedly.

So that at the same price, or more especially at the reduced price, you cannot see it possible that the consumer of 14-candle gas can be in any sense mulcted by the adoption of this as against 16-candle gas?—I cannot. The only difficulty I have in my mind is as to the time that it will take to change the burners. There will be an interval; and the question is what would be the best thing to do in the interval, and what is the interval to be.

That is a practical question for the Company?—Yes. The period it would take to effect the transition is the only time during which there would be any suffering.

You believe that the consumer would not suffer if he had 14 in place of 16 candle gas?—He would not—that is to say, the average consumer. I am not speaking of the consumer who uses the argand burner.

But that is not usually adopted?—No.

If, in process of time, and, perhaps, by the decision of the Law Courts, the incandescent light becomes cheaper and more generally adopted, do you think the consumer would suffer by having 14 rather than 16 candle gas?—Certainly not. It is better for the incandescent burner to have gas of a less illuminating power.

The consumer will not suffer under existing conditions; nor will he suffer under prospective conditions, I take it?—That is so.

You think the incandescent burner is a thing that is likely to become more popular and develop?—Yes; it must. I quite corroborate the evidence of Mr. Webber.

In reply to an inquiry by the Chairman,

Mr. LIVESEY said that the offer of the Company was only to supply burners—with a governor—to the users of slot-meters. They would want 300,000 of these governor burners; and he could not say how long it would take to make them.

Mr. SUGG: It would take about three months.

Mr. CORRIE GRANT: What would be the number required, supposing all the consumers were supplied?

Mr. LIVESEY: Over 1,000,000—perhaps 1,200,000. Of course, we should keep a stock of these burners.

After some conversation as to the production of the proposed new clauses,

Lord R. CECIL said the day before, on the subject of the supply of burners by the Company, he had said that, in reply to Mr. Leighton, "Of course, it is a very important matter. Speaking on the spur of the moment, I do not think there will be any difficulty in drafting a clause to the effect that the Gas Company shall be bound to supply an improved burner to any consumer who asks them for it." By this undertaking, Mr. Livesey instructed him that he was prepared to abide.

The CHAIRMAN: Mr. Livesey goes further, and says that he will give burners with governors in the case of the slot-meter consumers.

Mr. CORRIE GRANT then briefly addressed the Committee on behalf of the district of St. George-the-Martyr; arguing that if the Gaslight and Coke Company's district south of the Thames were purchased by the South Metropolitan Gas Company, the residents in that area would lose the benefit of competition. Competition at present had given them cheaper gas than that supplied by the Gaslight and Coke Company north of the Thames. He pointed out that the residents in the district of St. George-the-Martyr were an extremely poor class of people, who would not even be able to afford the cost of changing their gas-burners.

The CHAIRMAN: They will mostly use the slot-meter, I suppose.

Mr. CORRIE GRANT said that was no doubt the case; but the Committee should have in their minds the necessity for safeguarding the interests of these poor residents in considering the preamble of the Bill. With regard to Mr. Livesey's evidence, this gentleman was a well-known gas expert; but the learned Counsel was not familiar with him as a philanthropist. When, therefore, he came forward in that capacity, it was necessary to examine what he proposed, so as to see whether he was not giving more to the Company than to the consumers. He was escaping the obligation to enrich, which cost 1·12d. per 1000 cubic feet, and was getting in return the right to use different coal from that at present employed, and so to go to a much wider area of coalfields, and therefore to make a very much better bargain for coal than he could at present. The matter seemed to come down to this: Was the consumer to have a fair share of the benefits Mr. Livesey proposed. All that he could do, having no expert testimony, was to direct attention to the evidence, which showed, at any rate, that the change would be of very considerable benefit to the South Metropolitan Company. He invited the Committee to put aside the philanthropist view altogether, and see whether the consumers in the district of his clients had been sufficiently protected.

Evidence was then called for the London County Council.

Mr. *Haward*, examined by Mr. TALBOT.

Witness said the proposals of the Company in the Bill were a new departure, and objectionable, *primâ facie*, as introducing a new complication by destroying the uniformity which had hitherto existed with regard to the illuminating power and sliding-scale arrangements of the three Companies of the Metropolis. As a matter of fact, the provision with regard to uniformity had produced actual uniformity; the average illuminating power of gas supplied by the three Companies in 1898, according to the official tests, having been: Gaslight and Coke Company, 16·40; South Metropolitan Company, 16·40; and Commercial Company, 16·38. So far as he knew, neither of the other two great Companies had expressed themselves favourably to the change. The Gaslight and Coke Company had spent considerable sums on enriching plant, so that the policy of enrichment had not been abandoned. He also objected to the proposed system of averaging with regard to the illuminating power; but, in so far as the period had been reduced to one month, the Bill was improved. The Bill would secure the rights of the Company with reference to dividend. At present, it was perfectly easy for the public to know the rights of the Companies in the matter of dividend; but under the Bill, before these rights could be ascertained, the official testings would have to be obtained, in order to get the average illuminating power. This would be introducing another element for consideration. A very important question arose with regard to the reduction of 1d. in the initial price, as a fair equivalent for the reduction of 1 candle in the illuminating power—assuming that the illuminating power ought to be reduced. This did not seem to be sufficient compensation to the consumer. He had worked out some figures from the evidence already given before the Committee, to show the effect upon the consumer. He believed it had been admitted by Professor Lewes that the increased consumption of gas which would take place in consequence of a reduction of 1 candle would be 16 per cent.

Lord R. CECIL asked for the reference to this statement; but although an effort was made to find it, it was not produced.

Witness (continuing) said that there would be an increase in the consumer's gas bill of 16 per cent., so that the consumer would have to pay 4½d. more per 1000 cubic feet for the same result in light as at present. Instead of 2s. 4d., he would have to pay 2s. 8½d.

The CHAIRMAN: Then I should think the fines to which the Company are liable under the existing Acts are lamentably insufficient—if by reducing a single candle power you would consume 16 per cent. more gas. One candle power lower than the standard you say will entail 16 per cent. more consumption?

Witness: I do not say so; but our witnesses are prepared to support it.

By lowering the gas one candle, you inflict a certain disadvantage on the consumer, to the extent of 16 per cent. If that be the case, is not the penalty to which the Company are subject for reducing the illuminating power 1 candle monstrously insufficient? What is the penalty to which the Company are subject for going down to 15-candle power?—£20 a day, I think.

Mr. TALBOT: £100.

The CHAIRMAN: Well, what is £100!

Witness (continuing) said he had not finished the calculation. He did not say that the 4½d. was lost to the consumer; that was only the first item. It was suggested also, by Professor Lewes, that the cessation of enrichment would save the Company $\frac{5}{10}$d. per 1000 cubic feet in working expenses; and then it was stated that the increased sales of gas yielded a profit of 1¾d. per 1000 feet (this figure being arrived at by taking 40 per cent. of the 4½d.). Then the reduction in the initial price proposed, of 1d. for each candle less illuminating power, would save the Company £7500 a year, which was equal to ⅛d. per 1000 feet. The consumer would receive seven-eighths of the three items—the 0·3d., 1¾d., and ¼d.—which equalled, roughly, 2d. So that, while on the one hand the consumer would pay 4½d. per 1000 feet more for his gas, he would receive in future reductions of price about 2d. He would therefore lose (say) 2½d. per 1000 cubic feet.

The CHAIRMAN: But your whole argument goes if your 16 per cent. is wrong.

Witness: Certainly.

Further examined, witness said that, with regard to the sliding-scale, the Company had not adhered to the proposal of the Select Committee, but had simply taken the benefit of the secondary sliding-scale, which rather did away with the object of the Select Committee. The effect of the sliding-scale proposed in the Bill would be to give the Company more than the Select Committee's scale gave them, and more than they were entitled to at the present time. Taking the price at 2s. 1d., for instance, the Company would be entitled to a dividend of £5 14s.; the Select Committee's proposal would give them £5 16s.; and the Company's proposal would give them £5 17s. 4d.—with gas of 16 candle power. The reduction in initial price from 3s. 6d. to 3s. 3d., would not be very serious. The Bill did not compel the transfer of the portion of the Gaslight Company's area south of the Thames; and there seemed no likelihood of the transfer taking place. The Council held that the area ought to be transferred; and that if the Companies could not agree, it should be made compulsory, on arbitration terms. The Council also objected to the proposal that the Company should have power to raise such sum as they would have to pay in connection with the transfer, *plus* 10 per cent. The more convenient form would be to state a round sum of money. With regard to the transfer of the Gaslight and Coke Company's area, if this took place it seemed that the obligation now resting on the Gaslight and Coke Company to charge north of the Thames the same price for gas for public lamps as they were charging in the southern area, would disappear, and they would be able to charge the same as they charged ordinary consumers. The difference might be £29,000 a year; it would be a large sum.

Cross-examined by Lord R. CECIL, witness said that the proposals of the Bill differed from those of the Committee of last year. For instance, if the price of gas was reduced to 2s. 1d., by the proposals of the Committee, the Company would have been able to divide £5 16s.; whereas under the Bill, the amount would be £5 17s. 4d. It was true that the Bill would afford a greater inducement to the Company to reduce the price of gas; but the increment of profit to the Company would come out of the pockets of the consumers.

The CHAIRMAN: Under the additional sliding-scale required by the Committee, the Company are to get the benefit of 2s. per cent. dividend on a reduction in price of a complete 3d. per 1000 cubic feet?

Witness: Yes.

It is an inducement or incentive to the Company to manage their business to that end?—Yes.

The difference of the proposal of the Bill is that, instead of having 2s. for a complete 3d. reduction, they should have 8d. for each 1d. reduction?—Yes. I prefer the proposal of the Bill.

If by struggling very hard, you got an advantage of 2½d. towards your reduction, and you failed in your 3d., and therefore all your efforts were nothing, would not that be rather damaging to the spirits of the Company?—I do not think so. The point is really very small, because the South Metropolitan Company are not at present dividing up to their statutory maximum. Therefore the alteration made by the Bill would not really practically affect them at the present time.

As regards the public, will it not be simpler to add 8d. dividend for every 1d. economized, than to have an interval of 3d. before any alteration comes in? Would this be more readily understood by the consumer than the dividing of 2s. for every 3d.?—Certainly; and still simpler if it were made 2s. 6d. instead—an eighth.

Further cross-examined: With regard to the district of the Gaslight Company south of the Thames, the suggestion was not that an unwilling purchaser should be compelled to buy from an unwilling seller. He understood the South Metropolitan Company were willing to purchase on fair and reasonable terms.

By Mr. LEIGHTON: The suggestion was not that the price of gas would be raised to the consumer by 2½d., but that the consumer would have to pay 2½d. more per 1000 cubic feet for the same amount of light. The idea of the County Council with regard to the transfer of the area of the Gaslight and Coke Company, without reference to the obligation as to public lighting, was that it would enable the Company to devote at once £29,000, or whatever the figure was, to reducing the price of gas.

Mr. EMMOTT: I understood you to say that, if this reduction in candle power were made, the price of gas would be raised. What you meant was that so much more gas would be burnt that it would be equivalent to raising the price 2½d.?

Witness: I thought I was careful to say that the price per 1000 cubic feet would not be raised, but the consumer's gas bill would increase.

Mr. TALBOT: It is the price of light, as distinguished from the price of gas.

Mr. LEIGHTON: It would not be so, if these burners have the effect we are told.

The CHAIRMAN: It is a matter of expert evidence.

Mr. *W. J. Dibdin*, examined by Mr. TALBOT.

Witness said if gas of lower illuminating power was passed through the same appliances as gas of higher illuminating power, the result was less light and greater consumption of gas. The result was very much affected by the burner used. The extra cost of the improved burners to the Company—2d. or 3d. each—was very small compared with the extra money the consumer would have to pay in consequence of being supplied with lower-quality gas. The new burners would not counterbalance that cost. Witness proceeded to refer to a large diagram giving information with regard to the amount of gas which would have to be burnt, according as the quality of the gas and the burners used varied. Thus, with a Bray No. 4 burner, with 16-candle gas, they would burn 100 per cent.—the normal volume. If the quality fell to 15·2 candles, a quantity equivalent to 135 per cent. would have to be burnt; if the gas fell to 14·2 candles, the quantity would be 180 per cent.; and so on, for each of the qualities represented, until with 11·3-candle gas this burner would require no less than about 380 volumes of gas, instead of 100, in order to obtain the same amount of light as with 16-candle gas. Going the other way, with 17·2-candle gas, the same amount of light could be maintained with 84 per cent.; and with 19·2-candle gas, with only 60 per cent.—or a little more than half the gas of 16-candle power required to give the same light. A point he wished to bring out was in regard to the comparison of the German and the English figures. Mr. Webber gave the figure of 11½ candles as the quality of the gas used in Germany; and he stated that a manufacturer there told him he could not afford to use flat-flame burners. This diagram supplied that explanation. Presuming that he was using a Bray No. 5 burner, with 11½-candle gas, to obtain the same amount of light as he would get from the normal quantity of 16-candle gas, he would have to burn about 290 volumes of gas, against 100 volumes—about three times as much. Mr. Webber told them the price of that gas was 5s. 6d. per 1000 cubic feet; so that the consumer would have to use three times 5s. 6d. worth of gas, which would give 16s. 6d. to represent the actual cost of the gas, as compared with the average here of about 2s. 6d. for the 100 volumes of London gas of 16 candles required to give the same amount of light. This explained the whole difference in the position of gas lighting in Germany as compared with England, and why there had been such tremendous development since the introduction of the Welsbach burner. Seeing that the money question was much accentuated by the extreme price, the German became more alive to his interests; but the ratio would be the same if similar economical processes were used in England, only the economy would be effected on the price in England instead of on 5s. 6d. Witness had made a series of tests with Mr. Sugg's burner on four different qualities of gas; and the result was the same as with the flat table-top No. 5. The burner gave a better intensity of light for any particular quantity; but the ratio of light remained practically the same as with the No. 5 table-top burner. Therefore any variations due to the influence of different qualities of gas, shown on the diagram in regard to the No. 5 burner, would also be shown in regard to the new burner which had been proposed. If with the lower quality the consumer had to burn a greater percentage of gas, the price would rise proportionately. The experiments shown on the diagram were made at the Widnes Gas-Works, where the "knocking about" of the gas which had been referred to took place. But, in order not to mislead the Committee, he repeated the experiments upon South Metropolitan gas taken at the testing-station of the London County Council in Southwark. The results were practically identical. As to the infusion of the atmosphere in the gas at Widnes, he was informed that whatever air was present, it was not more than would get in under the ordinary conditions of working. The results with regard to the Welsbach burner differed materially in the two sets of experiments. He was not surprised at this, because the performance of these burners always varied very largely.

Mr. TALBOT: What conclusions do your facts lead you to, as to the adequacy of the proposals of the Bill?

Witness: I say that, from the point of view of illuminating power, the Bill would be disastrous to anyone using white-flame burners. I hold that 90 per cent. of the gas used for illuminating purposes is burnt in flat-flame burners. The largest quantity burnt in shops is consumed in butchers' burners.

You do not agree with Professor Lewes, who puts the incandescent light at 30 per cent. of the consumption?—He must have been under some misapprehension.

Your objection to the Bill, apparently, is based on the question of lighting. From the point of view of heating, your objection is not so great?—So far as the evidence goes, I should say that the 1d reduction per candle would fairly meet the case for heating. But that is only one side of the question. Those who use the gas for illuminating will be hampered by a largely increased cost.

Would it be possible, as a means of dealing with this question, to have one burner for the whole of the South Metropolitan district?—You could not with advantage use one burner over the whole district for any quality of gas. Mr. Sugg's burner is a very admirable one, and does good duty as a flat-flame burner when used in a globe. But the moment there is a draught, as the flame is a very feeble one, it is blown about everywhere; and when this occurs away goes its illuminating power.

We know that a great deal of the gas burnt in London is actually consumed in the open air?—Quite so.

Lord R. CECIL (in cross-examination): Do you say that the burner produced by Mr. Sugg is not so good for general purposes as an ordinary burner?

Witness: Not so good as the union jet.

Your contention is that the fishtail burner is the one to use in a draught?—Yes; the burner to be used depends upon the different purposes for which you want it. I employ different burners on my own premises.

Is the fishtail burner the right one to burn in a draught?—There are fishtails and fishtails.

Is the union jet the same as a fishtail burner?—Yes. But certain union jets are better under pressure than other fishtail burners.

Is unenriched or enriched gas the best, from the point of view of reaching the consumer unimpaired through small pipes?—That is a question that puzzles me very much. I cannot understand the variations that take place. That is why I asked the Gaslight and Coke Company to have an investigation made; but they did not consent to it.

Do you think that, however you enrich gas, the enrichment is not of a permanent character?—That is contrary to the statements I have heard from gas companies on previous occasions. One says: "Yea," and another "Nay." Until I have proof one way or the other, I keep an open mind. I want information.

Have you carried out experiments yourself?—Only in a small way in the laboratory.

In reply to other questions, witness said he first advised the Metropolitan Board of Works in 1876, and after them the London County Council. He left the service of the County Council two-and-a-half years ago. He had never investigated the question of the permanence of enrichment, though he had been anxious to do so. The Gas Company would not give him the facilities he desired. As to heating purposes, he thought the case of the consumer might be met by a reduction in price; in that he agreed with Professor Dewar. A low-power gas went through the meter quicker than a high-power gas. It had a lower density when it was unenriched. In preparing the diagram he had submitted, he had used two Welsbach mantles; the reason being that one got broken. The mantles were so fragile that the moment they were moved, they became frayed and broken. The curves of light shown with the mantles varied very much; for although the incandescent light was good, it was variable in intensity. The behaviour of any gas in a burner depended very much upon the character of the gas—that was to say, the manner in which it was enriched. Under any of the conditions in which he had made his test, so far as the use of the burner was concerned, the interest of the consumer would suffer. Under ordinary conditions, a fishtail burner—say, a Bray No. 4—gave 8·6 candles with 4·3 cubic feet of gas—that was about 2 candles per cubic foot of gas. Table-top No. 5 burners, with 16½-candle gas, gave over 3 candles per cubic foot, or practically the same as Sugg's No. 6. With 5·5 cubic feet of gas, he got an illuminating power of 18 candles. The burner was a pretty good one. No doubt, a better light could be secured by one burner than by another; but it would be wasteful to use a burner which required a large quantity in a passage or in a draughty place, where only 2 or 3 candle power was used. There were many cases in which only a small light was required.

By the CHAIRMAN: In a small room the air would be vitiated by the use of the large burner proposed; and the light could not be turned down without altering the conditions at which the burner performed the duty claimed for it.

Further cross-examined: It was not true to say that the question of burners made so much difference that all questions of the illuminating power sank into insignificance compared with it.

Mr. TALBOT (in re-examination): Do you regard it as possible, under present conditions, for the great majority of consumers now to adopt the Welsbach burner?

Witness: No; it would be most inadvisable in many instances. He had used the burner himself, and in some cases had to abandon it. The expense and annoyance connected with it simply prevented its use; it was not a light for universal application. Whatever the burner, the poorer the gas the quicker it would have to be burnt to produce the same light.

By Mr. LEIGHTON: He could not see the advantage of unenriched gas. He could perceive a disadvantage in it, as regarded luminosity. The same objection did not apply to it with regard to cooking.

By the CHAIRMAN: He was not prepared to state that the luminosity of gas was or was not affected by enrichment being deposited. Some of the variations in the quality of gas which his tests had disclosed were due, in his opinion, to oversights or variations in the manufacture. The variations, he believed, were not due to changes of temperature, because he had kept petroleum vapour mixed with air over water for weeks without condensation taking place. Why, therefore, should the same vapour condense in gas?

The CHAIRMAN: Homogeneous coal gas will not, in your judgment, as

a scientific man, give any greater security for regular and constant illuminating power than gas enriched by these processes?

Witness: No; I do not think it would.

Therefore the scientific evidence that we have heard on that subject is such that we ought not to rely upon it?—Unfortunately, I have not been able to obtain any confirmation of it. I have been struck by the remarkable absence of precise and definite information on this point. Gas of 14 candles could be produced from coal without enrichment; and being sent out from the works at 14 candles, he should expect it to arrive at the consumer's burner, under normal conditions, of about the same quality. In London, it reached the consumer at from 11 to 17 candles, or on an average from 14 to 14½ candles.

Therefore, if the Company undertook to make gas (and charged accordingly) of 15 candles, and being homogeneous, it arrived at the consumer of the strength at which it emanated from the works, the consumer in London would, under the new Bill, have about 1-candle power more than to-day?—In some cases.

Is it your opinion that, with a homogeneous gas, there would be greater security for equality at the burner of the consumer than there is with an enriched gas which is not homogeneous?—I am sorry to say my experience does not lead me to think so.

Mr. Rostron asked if witness had had any experience in connection with the manufacture and distribution of gas.

Witness answered in the affirmative. On one occasion his services had been enlisted by the South Metropolitan Gas Company at their works; and he had not been there long before he put his hand on a fault, and showed the Company how to save £2000 a year.

Mr. Livesey: That was in connection with the chemical testing of lime.

The Chairman expressed a hope that to-morrow the promoters would put the Committee in possession of their proposed new clauses. He asked for information as to the result of the conference between the three Gas Companies, the London County Council, and the Board of Trade on the previous afternoon, in relation to the Bills of the County Council and the South Metropolitan Gas Company dealing with the subject of the prepayment-meter system.

Mr. Livesey said that the three Gas Companies had met, and had invited the County Council to join them; but Mr. Haward had been unable to comply, as he had a Council meeting to attend. The three Companies had agreed; the principle of agreement being that laid down in his (Mr. Livesey's) evidence—namely, that the charge to the consumers for fittings should be a certain percentage calculated on the price of gas.

The Chairman: I hope you will take steps as soon as possible to obtain the consent of the County Council and of the Board of Trade to the conclusions of the three Gas Companies.

Mr. Livesey: The Board of Trade will have nothing to do with it; and they want us to settle the matter ourselves.

The Committee then adjourned, and it is understood proceeded to view an apparatus illustrating the effect on illumination of substituting one description of gas for another.

Thursday, May 17.

Dr. *Clowes*, examined by Mr. Talbot.

Witness said the proposals of the Bill with regard to the sliding-scale and illuminating power, under present conditions, offered great disadvantages to the consumer. He still maintained the opinion (which had not been in any way shaken by what had transpired before the Committee) that the tests of the illuminating power of the gas, as obtained at the present fixed stations, did not at all represent the quality of the gas surrounding these stations; and if this were so, the Company would not be right in settling the charge according to the tests in the fixed stations. He would be satisfied, so far as the tests were concerned, if there were a wider method of testing. With regard to the statement that, if enrichment were done away with, the quality of the gas over the whole area of supply would be approximately uniform, he said this assumed that enrichment was the only cause of the variation in the illuminating power of gas. But there were many other causes—such as the use of coal of varying illuminating quality, and the volume of gas extracted from a given weight of coal. In all the works he had visited (which did not include those of the South Metropolitan Company), the gas was actually drawn from the retorts by an exhauster; and it was freely confessed that, according to the extent to which the exhauster was employed, the amount of air which entered the gas would vary. He submitted that the abolition of enrichment would not in any way secure the uniform quality of the gas, so far as illuminating power was concerned. Moreover, if the proposal was to be fair, the testing-station should in every case represent areas of equal consumption, which was emphatically not the case at present. If the price were to be based on the average results of the stations, very poor gas might conceivably be supplied to a district of large consumption, and richer gas to one of smaller consumption; and this would be palpably unjust. Assuming that those in charge of the works had the most honourable intentions towards the consumers, with the South Metropolitan Company the workmen were largely shareholders; and although this was a very satisfactory arrangement in other respects, it was not so to the consumer, because evidently a workman with not much conscience might say: "If I supply gas of an inferior quality, it will be for the benefit of the shareholders, of whom I am one." This should be remembered. Witness was sure the lowering of the candle power from 16 to 14 candles would not be adequately compensated by a reduction of 2d. per 1000 cubic feet in the price. The assumption was made that the consumer would supply himself with the Welsbach burner; but this was very costly, both in the first instance and in regard to maintenance, because it required to be frequently renewed. As to the possibility of supplying unenriched gas of over 15-candle power, they had Mr. Livesey's statement that he could furnish it of an average illuminating power of 15 to 15½ candles. The figure Mr. Livesey fixed upon in the London County Council Bill was 15½ candles. It would be much more satisfactory, supposing there were to be a reduction at all, that it should be to 15 candles. As to the cost of enrichment, he was informed by practical men that the expense of obtaining higher candle powers—say, 16 or 17—was very small, and that it might be far more advantageous to the consumer for the Companies to incur this outlay and maintain the present or a higher standard, rather than the lower one. It would be a very great disadvantage that the consumers north and south of the Thames should have gas of varying quality.

Mr. Rostron (in cross-examination): It seems to be your idea that the South Metropolitan workmen, because they are shareholders, will be less likely to do their duty to the consumers?

Witness: I think there is temptation thrown in their way by their becoming shareholders.

Questioned as to the divergence in the tests of enriched gas which the portable photometer had shown over long periods, and the fact that when similar tests were made for a fortnight with unenriched gas, this variation did not appear, witness said that this did not suggest to him that the divergence was caused by the enrichment. It being suggested that the enrichment disappeared, he said gas might have deposited naphthalene or other substances in the pipes, and then other gas taken these substances up again. It was quite conceivable gas might enrich itself by passing through the mains. He did not agree that the incandescent light was the cheapest form in England.

By the Chairman: A company infusing too much air into their gas would reduce the quality; but such gas was not found at the testing-stations.

The Chairman: Do you suggest that this purposely and intentionally vitiated gas is diverted to some other channel, and does not go to the testing-station?

Witness: I do not think any other conclusion can be drawn from these results. He could not think the irregularity between the gas as tested at the stations and at consumers' premises was caused in any degree by the enrichment.

Your experience does not enable you to suggest to the Committee any other cause?—I cannot suggest any other cause.

You have no explanation to make to the Committee?—I can see no explanation. The facts are before us; and I stand by the facts. I see nothing in Mr. Dibdin's tests to show that the variations may be due to the enrichment.

Dr. *Percy Frankland*, examined by Mr. Talbot.

Witness said he considered the proposals of the Bill with regard to the sliding-scale on the basis of illuminating power, as highly disadvantageous to the consumer. It was proposed to allow a considerable amount of variation in the quality of the gas. Burners were constructed to consume a particular quality of gas to the best advantage; and any variations, therefore, would lead to disadvantageous consumption in particular burners.

Mr. Talbot: Do you think it is possible for the Company to provide against this by any system of themselves supplying burners to consumers over the whole of their district?

Witness: It obviously could not meet the point about variation in the quality of the gas. Whatever burner they supplied would be suitable for a particular quality of gas; if the quality varied, it would cease to be the best. The manner and place in which the burner was used would considerably affect the result. A 16-candle gas in a flat-flame burner which would consume it to the greatest advantage, would not be suitable for a draughty place, such as a butcher's shop. If they had a 14-candle gas, a burner which would deal with it satisfactorily in a draughty spot would do very badly elsewhere.

Mr. Nicol: The consumer has no control over the pressure of the gas.

Witness: Except in using a burner with a smaller or larger aperture. He has a right to receive gas at a sufficient pressure to enable him to use what burner he chooses.

By the Chairman: The lower the quality of the gas, the greater disadvantage would the consumer experience where there were draughts.

Mr. Talbot: I take it that, in your view, a high illuminating power is to the advantage of the consumer?

Witness: Yes; very much so.

In reply to further questions, witness said that he failed to understand how the new sliding-scale could have been brought before the public at all, as the reduction in price would depend upon the kind of burner employed. Moreover, the poorer the quality of the gas, the more would the atmosphere be vitiated in confined places. With the incandescent system, again, one was never sure of the amount of light one was going to get. It was good at first; but it gradually deteriorated, until it became bad, and it was necessary to change the mantle. Besides, the incandescent light could not be used in a draughty place.

Cross-examined by Lord R. Cecil: He considered the proposed reduction in the illuminating power of the gas in the South Metropolitan district would be a very serious matter to consumers. He had not made any experiments; but he was acquainted with those which had been carried out by Mr. Dibdin and Professor Lewes. They confirmed what had been general knowledge for the past thirty years.

Lord R. Cecil: What is the loss in the illuminating power of gas (say) with a No. 6 Bray fishtail burner?

Witness: It is 14 per cent. with 16-candle gas; and with 14-candle gas, it is 16 per cent.

Do you think there would be any difficulty in overcoming the inconvenience of draughts with the incandescent burner?—There would be difficulty, no doubt; but the obstacles are not necessarily insuperable.

Do you not think the consumer would be better off with a good burner and 14-candle gas, than with a bad burner and 16-candle gas?—That is not the question.

Whether it is the question or not, is for the Committee to decide?—The consumer with a good burner would necessarily be better off than the consumer with a bad one.

With a good burner, the advantage to him would be out of all proportion to the loss of 2 candles in the illuminating power of his gas?—That is supposing he had the worst kind of burner in use; and I do not think we have a right to assume that.

But he has a bad burner?—I do not know that all consumers have bad burners.

In re-examination, witness said he did not think the proposed basis for the sliding-scale would be satisfactory to the consumer.

Lord R. CECIL said that, on the point of the effect of draughts on low illuminating power gas, if the Committee desired he would recall Mr. Sugg.

The CHAIRMAN said the matter was of vital importance; and the Committee would like to have the fullest information on it.

By the COMMITTEE: The smoky character of a gas-flame was due to there being an insufficient admixture of air with the flame to ensure the efficient combustion of the hydrogen in the gas.

Mr. *Sugg* re-called.

The CHAIRMAN: In the matter of the table-top burner that you suggest as the most appropriate for 14 or 15 candle gas—the burner recently brought out by you—is it the fact that the flame it would give would be more subject to the influence of draughts than the flame from the ordinary fishtail burner now in common use?

Witness: In giving the same quantity of light?

Yes?—It would not be so susceptible to draughts, because the nature of it is such that it promotes a better consumption. Take two burners, the one burning 16 and the other 14 candle gas, they will give the same light; the little difference that would exist being all in favour of the 14-candle gas burning naturally. The burner is so made that it gives a better combustion. Therefore the flame is not so liable to be made smoky by draughts as the flame of 16-candle gas.

Mr. TALBOT: Do you mean that 14-candle gas gives a better light than 16-candle gas?

Witness: I do not say that.

The CHAIRMAN: Let us confine ourselves to the susceptibility to draughts. (To witness:) Please explain to the Committee the grounds on which you make your statement. Is it the fact that the orifice in the new burner is larger than in the old burners.

Witness: Yes, slightly.

And is it not also the fact that the gas will come at a lower pressure to the flame?—It will.

Coming to the lower pressure, is it not the fact that this makes the flame more flickering and lambent?—Not more flickering.

How is that? We have been told that, where the orifice for the flame is larger, the pressure is reduced, and the flame is less steady. How can this be avoided in the case of these burners?—By the shape of the new burner. It brings the gas at the same pressure through the cone—that is to say, to every part of the flame.

Mr. TALBOT (in cross-examination): You have in the course of your business supplied a vast number of burners to the consumers?

Witness: Yes; all over the country.

Are they suited to the gas burnt?—Yes; so far as we can make them.

Then why do you think you will introduce a great reform by adding another table-top burner to those in use?—It is not a table-top burner that I have added. It is a coned top.

What is the difference between that and the others?—As I say, the gas is brought to every part of the burner at the same pressure.

Would not the burner give a better result with 16-candle gas?—The difficulty is the same with all rich gases—viz., to get sufficient air to the burner. In the case of the new burner, I have endeavoured to produce a better combustion of gas by the shape of the top. In the flame it gives, there is less tendency to smoke.

But applying the new principle, do you not get a better result with the better gas?—You do not get a proportionately better result. The 14-candle gas shows the best result. With 16-candle gas, you cannot get perfect combustion.

The CHAIRMAN: When you say "better" you mean better in proportion?

Witness: Yes.

Lord R. CECIL: Greater efficiency?

Witness: That is so.

Mr. TALBOT: Do you regard a globe as essential?

Witness: No. A globe reflects the flame down. No doubt, it steadies the flame, as in the case of the chimney of the argand burner.

A great deal of the gas is burnt in the open air, is it not?—Yes; in butchers' shops, and the like. The burner the butcher uses is, as a rule, a piece of iron with a slit cut in it.

Is your burner only adapted to use in the rooms of houses?—No; it can be employed in cellars, and so forth. If it were fixed in the open air, I think it would work a great deal better than many of the burners in use in London now.

Do you make all the burners used in London?—No.

Ninety per cent.?—No. I should say the common burners are 70 per cent. of the whole number. The ordinary working man, if he could get this new burner, would use it because with it he would be able to have the equivalent of two burners at work while paying no more for his gas than he does now. He would get 16 candles, whereas he only gets 8 with his present burner.

Mr. *Otto Hehner*, examined by Mr. FREEMAN.

Witness agreed that an allowance of 1d. would be inadequate for each reduction of a candle in the illuminating power. It was desirable there should be uniformity all over London. By reducing the candle power from 16 to 14, the illuminating power of the Welsbach burner would also suffer; it would go down for every diminution of a candle from 16 to 14, by at least 4 per cent. In addition, it would be necessary to alter the burners. If a Welsbach burner was adapted for 16-candle gas, it would not give the best possible result if used for 14-candle gas. He knew the development of incandescent lighting exceedingly well in England and on the Continent, of which a very glowing picture had been drawn by Mr. Webber. It was true that in Germany and Belgium, and other Continental countries, incandescent gas lighting had been adopted by the public. But there such lighting was very cheap. Here, until the patents expired, it would not be cheap. It would require ten years at least for England to reach the present position of Germany in regard to incandescent lighting; and witness suggested that the proposals of the Bill might be postponed for this period. The bulk of the gas in this country was consumed in flat-flame burners; and the illuminating power given by such burners diminished far more rapidly than with others.

The CHAIRMAN: You mean to say it goes down in greater ratio than the candle power?

Witness: Yes; far more.

In order to obtain the same amount of light with these common burners, would the consumer have to burn a far greater amount of gas?—Yes, which would not be compensated by the reduction in price.

Questioned as to the Company supplying fittings, witness said he should have thought the ordinary consumer would look with suspicion upon whatever was offered by the Gas Company.

Mr. FREEMAN: I see, under the clauses proposed, the Company are only to supply these new burners when requested to do so by the consumers?

Witness: Yes.

Do you think this would be a real remedy?—It would suit some people; and, with those who adopted it, it would be effective.

Cross examined by Lord R. CECIL: The chief reason why uniformity was desirable in the Metropolis, was that the burners used should be constructed for a particular quality of gas; it was mainly a question of burners. If 14-candle in place of 16-candle gas was consumed in a Welsbach burner, instead of getting a duty of 20 candles, only 17 candles per cubic foot would be obtained. As a fact, he agreed that there would be a great deal more difference than that, in accidental variations and deterioration in the mantle. He doubted whether many consumers would take the new burners from the Company; and he did not think they cared very much about a candle or two in the quality of the gas.

Mr. *Isaac Carr*, examined by Mr. FREEMAN.

Witness said that for years he had sold gas of 18½-candle power within the borough of Widnes; the statutory standard being 14 candles. This was sold at a lower price than at any other works in the kingdom, and also at a lower price than gas had ever been sold at in the annals of gas lighting. The prices were 1s. 5d. per 1000 cubic feet to the small consumers, 1s. 3d. to consumers of over 3 million feet per annum, and 1s. 1d. to users for motive power. The Corporation had supplied the higher quality gas on his advice, and being of opinion that it was in the interests of the consumers. It had always been their aim to sell gas of a remunerative quality. He had heard Mr. Livesey's statement that the illuminating power within a range of 2 or 3 candles was of no importance, because it was entirely in the hands of the consumer to remedy. Witness disagreed with this statement entirely. Such a reduction would involve the consumer in considerable loss. Varying standards of illuminating power were undesirable in the best interests of the consumer, having regard to the ordinary type of burner in use. Tests showed him that, with a batswing burner, he had to burn 5 cubic feet per hour of 14-candle gas more than he would have to burn with 16-candle gas to produce the same light. The value of a diminution of 1 candle in the illuminating power on the price of the South Metropolitan Company (2s. 4d.), he estimated at 4½d. per 1000 cubic feet, which was in accord with the evidence of Professor Lewes. So that the reduction asked for, from 16 to 14 candles, would mean 9d. per 1000 cubic feet difference in the quantity of gas consumed. In incandescent burners, there was a loss of 3·1 per cent. per candle. As bearing on the question of the alleged advantage to the consumer of low-grade gas for heating purposes, witness said non-luminous gas had for years past been used for heating and motive power; but it was necessary to consume four or five times the amount of it to get the same heating power as with coal gas. He did not think enrichment was a waste of money for cooking purposes; the proposed rebate would compensate for that, but not as regards the loss of lighting power. Mr. Livesey's estimate of 2d. per candle per 1000 cubic feet as the cost of enrichment with cannel, was somewhat high; as was also his estimate of 1d. per candle per 1000 cubic feet for petroleum spirit. Two-thirds of these figures would more properly represent general experience throughout the kingdom, especially with gas of about 15½ to 16 candle power. As regarded the benzol method, it was matter of surprise that Mr. Livesey omitted to mention it. Benzol to-day cost 8d. a gallon, at which price it would enrich gas from 15½ to 16½ candles at a cost of ⅜d. The cost of the application of benzol spirit was practically *nil*. The plant for its use by a huge gas-works could be bought for a few hundred pounds only. The cost of enrichment to the Company did not bear a proportionate relation to the loss sustained by the consumer in the reduction of quality. While the Company might keep up the quality from 14 to 16 candles at an additional cost of ⅓d. to ⅜d. per candle per 1000 cubic feet, the loss to the consumer by reducing the quality from 16 to 14 candles for ordinary purposes would be 4½d. per candle per 1000 cubic feet—making 9d. on the 2 candles. Allowing for the rebate by the Company of 1d. per 1000 cubic feet, the consumer would still be at a disadvantage of 3½d. per candle. With regard to the efficiency of flat-flame burners, he understood Professor Dewar to say that he obtained, with the special burner described by Mr. Sugg, a higher efficiency with 14-candle gas than he did with gas of 16-candle power. This statement was contrary to all knowledge and experience; and no gas engineer would accept it.

The CHAIRMAN: Professor Dewar was admittedly on that occasion using a burner, according to the statement of the maker, adapted to 14-candle gas?

Witness: Yes.

Do you deny the possibility of producing, under those circumstances, a better result with 14 than with 16 candle gas, to which the burner was not adapted?—Speaking from my experience, most decidedly.

With the evidence given by Professor Dewar, why did it not occur to you that in the last two days you might have made a trial?—Mr. Dibdin made some experiments; and I asked what the results were. He told me they were as nearly as possible the same as with the table-top burner. To get the same amount of light, you require to burn about 23 per cent. more gas of 14-candle power than if it were of 16 candle power.

By Lord R. CECIL: All burners were more efficient with 16 than with 14 candle gas.

The CHAIRMAN: Then, according to your statement, it does not matter what sort of burner a man puts on?

Witness: Yes; but if you have a good or a bad burner, your result is better or worse according to the quality of the gas. A good or a bad result depends on the burner used.

That being so, I cannot understand your position when you say that one burner is as good as another?—One burner cannot be as good as another with the same quality of gas.

I can understand your saying that, with a given burner, good or bad, you will get more light with 16 than you will with 14 candle gas?—And you will get a better efficiency.

The CHAIRMAN: I cannot understand that. I cannot understand your saying that the question of efficiency, having regard to the difference in quality, does not depend upon the burner.

Witness went on to say that, with the lower-quality gas, the consumption per cubic foot increased, and therefore the efficiency of the gas must have decreased. He could not understand Professor Dewar's opinion at all. Enrichment was a very desirable thing; and enriched gas was better then unenriched gas from the consumer's point of view. Up to 16 candles, the difference in efficiency between enriched and unenriched gas was infinitesimal. As the quality increased, the liability to deposition also increased. If there was condensation, it not only took away the enrichment, but diminished the light-giving power of the original gas; but he had never found, when gas had been properly carburetted with spirit, a trace of condensation in the mains.

Lord R. CECIL: You have been extraordinarily fortunate.

Witness: No. He added that when the carburettor had not been properly attended to, there had been deposit.

By Mr. LEIGHTON: The Widnes Corporation paid something like 4 per cent. on their capital. They made a profit out of the gas undertaking, and were able to contribute 2d. per 1000 cubic feet to the rates.

By the CHAIRMAN: Though low, their charges were not so low as those of some other authorities.

By Mr. NICOL: They were able to sell at a low price, because their cost of manufacture was low. When he took charge of the works, some eighteen years ago, the price of gas was 4s. per 1000 cubic feet; but it had gone on decreasing ever since. He bought a low-priced coal, and used an enricher.

The CHAIRMAN: I ask you, as a practical man, to say how the difference occurs between gas of the illuminating power of 16·2 candles when tested at the testing-stations and of 14·8 candles when tested at a board-school?

Witness said the Chairman had addressed the same question to him when he was last before the Committee; and he had replied that he did not know how the difference arose in London. He had added, however, that if such a result occurred in his own district, he should say that the 14·8-candle gas was differently treated in the process of manufacture to the 16·2-candle gas.

Do you mean to say that you should hold that the gas tested at the testing-station was not the same as that tested at the board-school?—I confine my remarks to my own district. I can tell you what I should do to bring the result about there.

And would the same principles apply in London as in Widnes?—Precisely.

Then I will take your answer?—I should enrich a part of my gas.

Then, in your opinion, there is no other explanation of the difference, except fraud?—I cannot say. I do not know.

You say that enrichment by benzol and carburetted water gas will carry?—Yes; they are very permanent up to 16 candles.

You would not say that the difference between 16·2-candle gas and 14·8-candle gas would be accounted for in the variation in quality of the enrichment?—Not in my own locality. I should say that there was a difference in the process of manufacture.

Would stagnation in the pipes have anything to do with it?—There is, as we have heard, a "flowing main" up to the testing-station, but not so flowing a main perhaps up to the board-school. I have gone with the portable photometer into various parts of London where there were no fixed testing-stations, and have taken testings; and I have found the gas at 16·2 candles. I should think it hardly possible to have a stagnant main in London.

If a homogeneous gas is to be made by the South Metropolitan Company of 14 or 15 candles, do you think the consumer would get gas of that quality at his burners?—In gas making, the quality of the gas is entirely at the will of the manufacturer.

Mr. Livesey is anxious to contract to supply 14-candle gas. Do you think if he sends out a homogeneous gas of that quality, it will survive until it reaches the consumer?—Yes; a 14, 15, or 16 candle gas would survive.

If, in real practice, according to the experiments of Mr. Dibdin and Dr. Clowes, the London consumer receives 14·8-candle gas, how much worse off will he be if he gets 15-candle gas under this Bill?—He will be 1·6 per cent better off.

Mr. *C. R. Bellamy*, examined by Mr. TALBOT.

Witness said that the London consumer would lose in the illuminating power of the gas, under the Bill, 27 per cent. The gas at present used gave 2·44 candles per cubic foot, with a flat-flame burner; and under the Bill it would be 1·78 candles. According to "Field's Analysis," he found that in the gas of corporations the average prescribed illuminating power was 15·35 candles; but they actually supplied 18·75-candle gas, so that they gave the consumers nearly 3·5 candles in excess of their statutory requirements. If they took the case of the Provincial Gas Companies, the average prescribed was 14·94 candles; while they actually supplied 16·03-candle gas, which was an excess of 1·09 candles. Then, taking the Metropolitan Companies, the prescribed candle power being the same in each case—16—they actually supplied 16·39-candle gas. It might be urged that these tests were not altogether reliable as to the gas supplied; but, at the instance of the Corporation of Sheffield, he had checked the figures, and found that they were substantially correct.

Cross-examined by Mr. ROSTRON, witness said that in Glasgow the illuminating standard had been reduced from 25 to 20 candles; and the Dublin standard had also been lowered.

The CHAIRMAN: You have heard the evidence given here as to burners?

Witness: Yes.

What is your experience in Liverpool?—That every grade of gas requires a special burner. You must change your burner with a change of gas. The higher the illuminating power of the gas, the more simple the lighting becomes. Liverpool gas, with an ordinary flat flame burner, will give better duty than London 16-candle gas. Our standard burner is the one commonly used; while that adopted in London is the argand burner, which is not available to the ordinary consumer.

Your 20-candle standard is not identical with the same form used in London?—No. The consumer gets gas of the standard value in Liverpool; but in London he does not, unless he uses the standard burner.

How will the London consumer be affected by having 14-candle gas? Will it increase his disadvantage or diminish it?—It will increase it, because he will have to use 27 per cent. more gas to get the result he has to-day.

Not with the Sugg burner?—Yes; with that. I have tested all the existing burners.

Having regard to all the facts, you think that a reduction in the price of 1d. for a diminution of 1 candle in the illuminating power of the gas is not enough?—I say it is not enough. The consumer should have 3·7d. per candle, in relation to the loss of light.

Mr. *Thomas Fairley*, examined by Mr. TALBOT.

Witness said he considered it was in the interest of consumers generally to have gas of high illuminating power; and in his part of the country that was the general rule. He agreed that, to obtain a given amount of light from a gas of low quality, required the consumption of more gas than with a gas of higher quality; the result being to render a certain proportion of the air unbreathable. More carbon dioxide was prodnced to obtain the same light with low than with high grade gas. At Leeds, cannel coal was used for enrichment. They were proposing to employ benzol at the end of the present year, when the cannel contracts expired. The cost of enrichment by that means, at the present contract price of cannel, was about double that of benzol. Yorkshire coal usually produced gas of not less than 16 candles; cannel, between 16 and 28 candles. It was necessary to adapt the burner to the quality of the gas; and this had to be done within a very narrow range. If gas were reduced from 16 to 14 candle power, with the common burners the increase in consumption would be about 15 per cent. per candle.

The CHAIRMAN: Taking the best burner applicable respectively to the 16 and the 14 candle gas, what is the difference in effect?

Witness: The difference in effect I happen to know partly by accident. I have a 14-candle burner in my house. I cannot burn Leeds gas without deposit of soot; and there is a waste of light.

But you are putting 18-candle gas through it. You have a wrong burner?—I know I have.

We have in London 16-candle gas. Take that with the best burner known for 16-candle gas, and you produce a certain effective light. Now I want you to take 14-candle gas, which is to be made by this Company, and apply to it the best burner known; and you will then get another result. I want to know what is the difference between the two results.—I cannot answer that; but I think the ratio would be about the same.

Using the best burner in each case, you think the difference between the two would be exactly the difference of the gases?—Yes; I think so.

The CHAIRMAN: That rather contradicts some of the evidence we have had before.

Mr. TALBOT: I think you have said, Mr. Fairley, that burners are extremely sensitive to minute variations in the quality of the gas. Therefore, the state of things that might be true if you always had gas supplied at a precisely uniform quality of 14 candles, might cease to be true if the quality varied slightly up and down?

Witness: It might, and it would.

Mr. TALBOT, replying to the Chairman, said: It is suggested that you get rid of the objection to reducing the illuminating power by adapting the burner to the gas supplied. One of our objections to the Bill is that it is impossible to do this satisfactorily, because you would have to adapt a new burner to the constant variations of the gas.

The CHAIRMAN: I do not understand that under the Bill it will be varied constantly.

Mr. TALBOT: The average is to be the result of a great number of tests.

The CHAIRMAN: The unintended variation will be the same whatever the standard.

Mr. TALBOT: Yes.

The CHAIRMAN: Therefore, it will affect the burner, whatever is adopted, in both cases the same.

Mr. TALBOT: Yes.

The CHAIRMAN (to witness): Suppose you got a burner adapted to 16-candle gas, and 16 candles is the standard, and you get in another case a burner adapted to 14-candle gas, and 14 candles is the standard, will the uncertainty of manufacture, the difficulty of approximating to the standard, influence the one gas to a greater degree than the other?

Witness: I think not.

Mr. TALBOT: With regard to heating, I think it is not contested that 1d. reduction will be a fair equivalent for the loss of illuminating power?

Witness: No; as far as the heating power is concerned.

By the CHAIRMAN: The evidence that the ratio of consumption would increase in greater proportion than would be expected from the change in the nominal standard, applied, he understood, to common burners. The lower-quality gas would cost the consumer more than the higher-quality gas.

The CHAIRMAN: Focussing the whole year, do you think the position of the Metropolitan consumer under the Bill will be worse than it is at present under the existing law?

Witness: If the law were efficient, I think it would be distinctly worse. It is difficult to say what the Metropolitan consumer gets now. If he receives at present 16-candle gas uniformly, he would certainly be worse off.

You are of opinion that he does not get 16-candle gas now?—Yes.

Friday, May 18.

Mr. BALFOUR BROWNE wished to say, before the Committee proceeded to hear the speeches of Counsel, that the fear expressed was that, by the reduction of the illuminating power, people would have to burn more gas to get the same light. He was prepared with evidence—and would submit it, if the Committee desired—to show that, when the illuminating power of the gas was increased, there was no diminution in the ordinary rate of increase in the supply of gas. He thought that this, to an extent, met the point made by some of the opponents to the Bill of the South Metropolitan Company. When the illuminating power was increased, there was no diminution in the consumption; but it went on at the ordinary rate of increase.

The CHAIRMAN asked when the illuminating power of the gas was increased.

Mr. BALFOUR BROWNE replied that it was in 1876 and 1880.

The CHAIRMAN said the Committee did not think it necessary that evidence should be called on the point in question.

Mr. LITTLER then addressed the Committee for the City of London—declaring at the outset that he did not propose to call evidence. His point, he said, was a very small one; relating solely to the statutory powers for public lighting. By the Act of 1860, section 37 (which was somewhat historical), it was laid down that the Gas Company should not charge a higher price for gas to the Public Authority than the lowest rate charged to a private consumer. This was confirmed by the Act of 1868. Under that Act and the Act of 1871, a scheme had to be prepared and submitted to the Board of Trade; and then an Order in Council was obtained which dealt, not only with the City, but with the whole of the North of London. This became law. So long, therefore, as the Gaslight and Coke Company had a district south of the Thames in which they charged a lower rate than they did north of the Thames, they were obliged to charge for public lighting over the whole of their area the lower rate. The result of passing the Bill would be that the Gaslight and Coke Company would hand over to the South Metropolitan Gas Company the district in which they charged private consumers the lowest price; and the figure on which they would be able to base their charge for public lighting would be the rate they levied all over the north. Inasmuch as the Gaslight and Coke Company would have lost the southern district, they would not be supplying the lowest-charged consumers; and therefore they would be able to deprive the City of the advantage it had enjoyed. This was his point. The moment the Gaslight and Coke Company got rid of the south side of the Thames, up would go the rate for public lighting in the City.

The CHAIRMAN: What difference will it make?

Mr. LITTLER said that at present the Gaslight and Coke Company were charging for public lighting in the City the lowest price they were charging the consumers in the south of London, which was 7d. less than the charge to the consumers in the north of London. This would make a difference to the City of £29,000 a year.

The CHAIRMAN: When it settles down to the final pocket, I do not think there will be much in it.

Mr. LITTLER said that the private pocket would not be improved. The only pocket that would be affected, would be the public pocket—to the tune of £29,000 a year. And that which came out of the public pocket, would go into the pocket of the Gaslight and Coke Company. The City was paying 2s. 4d. per 1000 cubic feet for public lighting, because this was the price south of the Thames. If the southern district was got rid of, the City would immediately have to pay 2s. 11d.; and this would be 7d. per 1000 cubic feet going straight into the pocket of the Gaslight and Coke Company. By one stroke of the pen, the Company would be able, in this way, to repeal the whole of the enactments which the City had obtained, at the cost of great labour and expense.

Mr. LEIGHTON: This was present to the mind of the Committee of last year, was it not?

Mr. LITTLER said it was not before them. There was then no opportunity of discussing it. It was only now, when the proposal was made by the South Metropolitan Company to purchase the district south of the Thames, that the City came forward to represent to Parliament the position of affairs. The aggregate quantity of the gas consumed by the public authorities was stated by Mr. Field and Mr. Livesey at 1000 million cubic feet; and taking this at 2d., it would mean £29,166 a year, which would go into the pocket of the Gaslight and Coke Company, without their doing anything for it. The result would be still worse if the price of coal went up, and there was a consequent rise in the price of gas, which was very likely to be the case. The City had spent thousands of pounds in satisfying Parliament that there ought to be the existing difference in price. And now, not through any change in the general circumstances, but because it became convenient that the Gaslight and Coke Company should hand this small district over to the South Metropolitan Company, it was proposed to mulct the Authorities in this large sum. Clearly, it was a temptation to the Gaslight and Coke Company to make this proposal. The amount the Company would gain—nearly £30,000—was 3 per cent. on £1,000,000; and this the Gas Company would receive for doing nothing.

The CHAIRMAN: Seven-eighths of it will go back to the public under the sliding-scale.

Mr. LITTLER said that this would depend on the economies of the Gas Company; and they had had a tolerable experience of the sliding-scale which was to be such a magnificent thing for the public. Besides, through the sliding-scale the money would not go back into the pocket of the same person. It would go to the private consumer, and not to the public. The Gas Company were offering no sort of equivalent. And why should they have even one-eighth of this £30,000 for nothing? The ratepayer had the advantage of this £30,000 at present. Why should it undergo the process of passing through the pocket of the Gaslight and Coke Company, trusting to Providence for it to come back again? It was well known what the Gas Company did. They took an amount out of their reserve fund every now and then, for the purpose of keeping up the dividends. They had spent £277,000 in this way; and the £30,000 would doubtless follow. When a bad year came—and they were very likely to have that soon, with the present price of coal—they would put the money to the reserve, and in a year or two apply it to the payment of dividend; so that the consumer would never get a halfpenny of it. He did ask the Committee not to interfere with legislation which had gone on very satisfactorily for so many years.

The CHAIRMAN: We have had no suggestion from you as to how that which you wish to prevent is to be obviated.

Mr. LITTLER said he would ask the Committee to keep alive the existing state of things. If they passed the preamble, he would ask them to say that they would not disturb the present position of affairs. If the Committee would concede that principle, he would bring up a form of words to carry it out.

The CHAIRMAN: You mean to say that if the Committee decide to follow the recommendations of the Select Committee of last year, they shall do so by a proviso safeguarding the interests of the City.

Mr. LITTLER: That is all—simply a proviso. This question could not be gone into before the Committee last year, because it was not a matter which was germane.

Mr. LEIGHTON: All this advantage to the public consumer is to the disadvantage of the private consumer.

Mr. LITTLER: The private consumer will remain exactly as he is, except that if the Company reduce the price of gas under the sliding-scale, he will get some advantage; but the public consumer will pay on the higher price.

Mr. LEIGHTON said if the advantage were taken away from the public consumer, the money would go to lower the rate of private consumers.

Mr. LITTLER: It might do; but I say it will not. It goes into the reserve and the other funds the Company have got. They are not bound to reduce the price.

The CHAIRMAN: When the reserve is accumulated, it is a protection to the consumer; and when it is depleted, it prevents a rise in the price of gas. The Company do not spend the reserve they accumulate in big dinners in the City; they keep it in their coffers.

Mr. LITTLER: But the reserve itself is a device for keeping up the price of gas. If there were no reserve, the Company would be obliged either to be content with less dividend or reduce the price of gas.

The CHAIRMAN: I take it these reserves are all regulated by Act of Parliament.

Mr. LITTLER: Yes; but the very Act of Parliament which dealt with them granted us this privilege.

Lord R. CECIL: Any such provision as my friend suggests would absolutely destroy our Bill on Standing Orders.

Mr. LITTLER: I cannot help that.

Lord R. CECIL: Because if we were required to insert any provision into the Bill putting compulsion on the Gaslight and Coke Company, we ought to have given proper notice before we introduced the measure.

Mr. LITTLER, in conclusion, remarked that he only wanted reserved to him that which Parliament had said in every Act since 1860 he should have.

Mr. FREEMAN then addressed the Committee for the London County Council, who, he said, were not opposing the Bill in any sense of hostility to the Company. Their view was that the Bill undoubtedly involved some very important, broad, and far-reaching changes—changes which were opposed to the recent tendency of legislation; and therefore it was necessary that the most careful inquiry should be made into the proposals. If the Company could establish to the satisfaction of the Committee that the changes would be for the interest of the public, and not merely of the Company, the County Council would not object; but they were extremely anxious that the consumers should not suffer. Already the Bill had been considerably modified; there having been no suggestion at first that the Company, at their own cost, would supply burners suited for the gas to be sent out. The Bill proposed to change the standard from 16 candles to a lower standard, which was not fixed, and might vary from time to time within certain limits. The County Council held that it required strong evidence of advantage to justify the alteration of the uniform standard which existed at present, practically for the whole of the Metropolis, though there were some Companies on the outskirts where the standard was different. Moreover, so far as they knew, the Gaslight and Coke Company and the Commercial Company were satisfied with the existing standard, and did not desire to alter it. If there was to be an alteration in the Metropolis, it could be much more satisfactorily done if all the parties concerned in supplying London were brought together in some such conference, under the auspices of the Board of Trade, as took place in 1876, when the matter could be thoroughly threshed out. He protested against the change being introduced in one district, and at the instance of one Company only. If it was for the public advantage that there should be reduction in one district, why was it not also to the public advantage that there should be a similar reduction in the case of the other Companies? It was doing by piecemeal legislation, what should be done by general legislation. He knew of no modern case—except that of Glasgow—where the standard of a Company had been lowered. The whole point depended on Mr. Livesey's argument as to the result of the enrichment of gas. Mr. Livesey, in effect, said "If at present at the testing-station I am giving gas of 16-candle power, but at the consumer's point of reception it has fallen to 14·8 candles, if I fix a standard which will give him the equivalent of what he receives now, he is not hurt at all." The answer to this seemed to be that there was no more reason to suppose that when Mr. Livesey had given up enrichment, and was simply producing his homogeneous gas, it would reach the point of consumption without loss, any more than would enriched gas. Counsel knew Mr. Livesey argued that enrichment was lost in the pipes, or in some other way. But they had the evidence of Dr. Clowes that the abolition of enrichment would not lead to uniformity; there being other influences, besides enrichment, tending to affect the quality. There was no equivalent given to the consumer for the drop in the candle power. If the obligation to enrich the gas were removed, there was no reason why the quality should not vary as it did at present. The whole of Mr. Livesey's case, so far as enrichment was concerned, broke down, or was subject to the very gravest doubt. It lay with the promoters to prove their case; and this they had not done. Then Mr. Livesey contended that 1d. afforded full satisfaction to the consumer; and so far as gas for heating purposes was concerned, no question was raised on this point. But as regarded gas for other purposes, the County Council had called a considerable mass of evidence which, if right at all, showed that, so far from 1d. being sufficient, it ought to be 3·7d. Even the penny involved a fallacy, because it was to be taken off the standard, not off the selling price. By the Company's own calculations, at 2s. 8d., the price to be charged in respect of the new capital, £750 per annum would be produced. So that six years would be required to reach the figure of £42,000, which would have to be reached before the reduction of 1d. could be made. In this case, instead of the reduction being 1d., it was a reduction of 1d. in six years, or $\frac{1}{6}$d. per year. Therefore the consumer would not get anything equivalent to the reduction asked for. Mr. Livesey said the getting of a good or bad result from the gas supplied depended on the burner; and he offered to supply, whenever the gas standard was altered, at the cost of the Company, fittings best suited to the gas. So that, whenever a change took place, if the consumer was to have the burner which would give the best result, Mr. Livesey would have to supply the whole of his 200,000 consumers with new burners. Surely this could not be right. The burners were to be supplied by the Gas Company at the request of the consumers; but how many would apply? The almost inevitable result would be that the consumers would burn more gas with the inferior burners. Then Mr. Sugg had been recalled to say he had found salvation in a new burner which he had just discovered; but the new burner was found to

give a slightly worse result than the one he had previously invented. If there was to be any alteration at all, it would be very much better that the standard should be fixed, instead of allowing the Company to wander up and down the sliding-scale, and cause the re-arrangement of the burners from time to time. As regarded the public lighting, the County Council held precisely the same view as the Corporation, as to the effect of the clause for the transfer to the South Metropolitan Company of a part of the Gaslight and Coke Company's undertaking. The money which the Gaslight and Coke Company would save should the transfer take place, if it was returned by the Company, would not go back to the same pockets, because it by no means followed that every ratepayer was a consumer, and every reduction in the sliding-scale would go to the consumer only. This matter was of much greater importance to the County Council than to the Corporation, because they represented seven times the area of the City. It was quite possible to suggest a method of safeguarding the public in this matter, without in any way endangering the Bill. On behalf of the Vestries and Local Boards he represented, he went on to point out that all the districts whose consumers were chiefly affected by the Bill, protested against it being carried in the present form. The population in these districts consisted chiefly of poor persons, who were quite unable to protect themselves; and therefore the Local Authorities came forward and asked the Committee very carefully to weigh the arguments on both sides, in order to make sure that the result arrived at was in the general public interest. They viewed with very considerable alarm the clause which provided that various testings should be taken into consideration, and made up on the average of a month. They were afraid that it would be possible, by taking these averages, to supply one district at a certain standard, and another at a different standard; and then, by taking the average of the two, to give a result which would be unfair to the consumer, and unduly advantageous to the Company. Mr. Livesey said this would not be done; but if it were possible there should be safeguards. As regarded the other points, the Local Authorities were in entire accord with the County Council.

Some discussion then followed with regard to the proposals in reference to slot-meters, and the position of the Companies, in the course of which

Mr. Danckwerts informed the Committee that the three Companies had come to an agreement, but that the County Council had not yet fallen into line. The agreement was that no more should be charged per 1000 cubic feet for gas than was now the established price by law; that in regard to automatic meters and fittings, there should be an inclusive maximum charge of 11d. per 1000 cubic feet, with a revision every seven years (to which there was an alternative proposal that there should be a maximum of 10d. per 1000 cubic feet), and no compulsory sale.

Mr. Talbot said the County Council agreed in substance to the proposal, except that they suggested 10d. per 1000 cubic feet—being 1d. more than the figure in the South Metropolitan Bill—with power of revision every seven years.

The Chairman said it would be a very simple matter to decide, if the parties left it to the Committee.

Mr. Cooper, Parliamentary Agent, said he was authorized, on behalf of the Commercial Gas Company, to give an undertaking that the Company would promote a Bill or Provisional Order to carry out any arrangement which the Committee might put upon the Gaslight and Coke and South Metropolitan Companies.

The Chairman: May I ask what the Commercial Gas Company are now charging?

Mr. Livesey: They are now charging 10d. over.

Mr. Danckwerts: I am told that, with regard to the Gaslight and Coke Company's Bill, there is some Standing Order in the way. We could do it by Bill or Provisional Order next session.

Mr. Emmott: It can be done in the South Metropolitan Bill.

Mr. Danckwerts: It can come in that Bill all right.

Mr. Talbot said there was not the least difficulty, because the agreement could be put in the County Council Bill, which applied to all the parties.

The Chairman: My suggestion is that you should submit that to the Committee; setting out the whole details in clauses, and leaving the price blank for the Committee to fill in. You, Mr. Danckwerts, have no objection to these slot-meter clauses being made operative as regards your Company through the County Council Bill?

Mr. Danckwerts: No; but I should like to say something as to the proper wording of the Bill, so that he who runs may understand.

Lord R. Cecil then addressed the Committee in reply, on behalf of the South Metropolitan Bill. He need say nothing about the slot-meters, nor, he understood, about the accounts.

The Chairman said the Committee were anxious to secure that there should be no complication in case the South Metropolitan Bill became law; and they had therefore consulted with the Official Auditor, and were informed that no difficulties would arise through the operation of any of the clauses of the Bill.

Lord R. Cecil (continuing) stated that the provision for the transfer of the portion of the Gaslight and Coke Company's area which was south of the Thames to the South Metropolitan Company was inserted to carry out the recommendation of the Committee of last year. The South Metropolitan Company had no anxiety to purchase it; and he was informed that the Gaslight and Coke Company had no desire to sell. The South Metropolitan Company were prepared to take power to agree with the Gaslight and Coke Company to purchase, but not to come under compulsory obligation to do so; and, indeed, the parliamentary notices in connection with the Bill precluded them from taking any such power. The effect of the transfer on the price for public lighting north of the Thames, did not really affect the South Metropolitan Company. But it did appear surprising that the Local Authorities should be getting their gas more cheaply than the private consumers; and when Mr. Littler talked about giving £29,000 to the Company, he totally ignored the effect of the sliding-scale, under which seven-eighths of this sum would go to the consumers. The Committee of last year might have recommended the transfer as a means of relieving the Gaslight and Coke Company. If the Committee were not satisfied about the provision, he asked them to strike it out, rather than put on the Company any such provision as that suggested by Mr. Littler. Moreover, in fairness to the Gaslight and Coke Company, when discussing this question, it was only right that they should be heard, which could not be done on this Bill; and therefore the Committee had not heard any reason against the proposal which might be brought forward by the other party to the matter. As to the contention that the Bill would interfere with the uniformity prevailing in London, there was no such uniformity, except on the one point of candle power; and in regard to this, it was the fact that the Suburban Companies had not the same standard. Apart from this, it was desirable on principle that, when making a change of this kind, it should be done in respect of one Company first, and not in the case of all. It was not a sound, though attractive, proposition, that they should make a change in all at the same time. This would mean that they were so certain of the result that they would apply it all over London without any experiment on a large scale, which was the only scale which could be effective. The main question was whether the South Metropolitan Company had made out that the change would be to the advantage of the public. The first objection was obvious—viz., that the change might result in loss of light to the consumer. Assuming that the illuminating power at the testing-stations, by the abolition of enrichment, would result in the reduction of illuminating power at the consumer's burner, he submitted that, in fact, no appreciable injury would be done to the consumer, because practically the consumer now used a burner which gave him 8 or 10 candles at the very outside—more often 4 or 6 candles—whereas with the new burner proposed to be given him he would get much more. Practically, and in effect, the Bill would give a better light to the consumers. It was said there would be an addition to gas bills; but this was all theoretical. Practically, the consumer did not care whether it was 14 or 16 candle gas he burnt; and the proof of this was in the fact that consumers persisted in using burners which, however improved, did not give them half the candle power they might secure from the gas. A burner constructed for the use of 14-candle gas was only slightly less efficient for 15 or 15½ candle gas; so that the suggestion that the burner would have to be constantly changed was illusory. The real strength of the case was that the consumer would get better gas than at present—or at least as good. The contention on which the Bill was founded was that natural gas was better and more permanent in every way than enriched gas. If it was more permanent, it followed that if the Company made 15-candle gas, and it reached the consumer substantially as it was made in the works, the consumer would get a better result than at present with 16 or 16½ candle gas, which only reached the consumer at 14·8 or 14·6 candle power. Mr. Carr said that enriched gas was quite as permanent as natural gas. There might be special conditions to account for this at Widnes; but he stood alone in the opinion. Dr. Clowes said that neither with natural gas nor with enriched gas could one be secure that the product of manufacture would always be the same. This was true. But he did not say, and did not suggest, that enriched gas was as permanent, once it had been enriched, as natural gas. Then Professor Lewes said, in effect, that while carburine enrichment was as good as any other, all carburine enrichments were non-permanent; so that he was against the County Council. Mr. Dibdin, in a report on the experiments made by Mr. Livesey when gas was supplied for a fortnight without enrichment, said the effect was limited to the official testing-places and their near proximity—that when they did not enrich for a fortnight, the consumers were unable to detect any difference in the illuminating power of the gas when it reached them; or, in other words, that it was so much more permanent that it reached them in the same condition as it left the works. This was really the case for the Bill. Therefore, on the evidence, it was unquestionable that there was far greater permanence in the supply of unenriched gas, and that gas was equally good for heating purposes and for the Welsbach burner, for which 75 per cent. of the South Metropolitan supply was used. Undoubtedly, the Bill would produce a cheaper gas. This was admitted; and he thought it was clear that what the gas consumers wanted was a cheap, pure gas, sufficiently bright for ordinary purposes. The reduction in price contemplated by the Bill went wholly to the consumer, unless the penny was not a true representative of the saving caused by the abandonment of enrichment. The Bill was to legalize the supply of natural for enriched gas, which had become necessary to meet changed conditions. It was said this was a great revolution; but a very great change had taken place in the conditions since the settlement of 1876. At that time, it was possible to use cannel coal for enrichment; now this was impossible, which was an enormous change. Since then, the electric light and the Welsbach burner had been introduced. This was a matter of immense importance, because it added great competition to the Company's difficulties, and rendered it necessary for them to make changes so as to compete on more equal terms. Lastly, there was another great change in the largely increased use of gas for heating purposes. These were the reasons the Company desired the alteration, the whole advantage of which would be given to the consumers. It might be asked if the Company came forward as philanthropists. This was not so. The Company would be better off, because they would be better able to compete with the Welsbach burner and oil, and save them, also, a certain amount of worry in connection with the enrichment process. Mr. Freeman suggested that the Bill ought to be suspended for some better inquiry to take place. They had had an inquiry lasting for several weeks; and the Committee had had before them nearly everyone in England capable of throwing light on the matter. Was the whole of the money and time so expended to be thrown away? If the Committee were satisfied that the change was for the public interest, they should not hesitate to pass the Bill, even though it did to a certain extent represent a change from the tendency of modern legislation.

The Committee then deliberated in private; and their decision on the three Bills (given later in the day) will be found on p. 1369.

Reduction in the Price of Gas at Preston.—Advances in the price of gas appear now to be almost universally the order of the day; but news is to hand of at least one alteration in price in the other direction. The Directors of the Preston Gas Company, when making up the accounts to the end of last year, having coal and oil contracts that were estimated to see them over the next two to two-and-a-half years, decided to reduce the price of their gas (of a standard quality of 18 candles) from 3s. 7¾d. per 1000 cubic feet to 3s. 5¾d., subject to discounts varying from 15 to 20 per cent.

MARGATE CORPORATION AND WESTGATE AND BIRCHINGTON WATER BILLS.

On Monday last week, a House of Lords Committee (Lord Brougham and Vaux in the chair) had before them the application of the Margate Corporation for an extension of district, and further powers to establish a pumping-station in St. Nicholas Wade; this district being under the control of the Rural Sanitary Authorities, and adjoining the district supplied by the Westgate and Birchington Water Company. The latter Company had also a Bill before their Lordships asking for an extension of district and further powers for making works, &c. Mr. Baldwin Latham and Mr. Edward Easton appeared as the expert witnesses for the Corporation of Margate; while Mr. William A. M'Intosh Valon (Engineer to the Company), in conjunction with Mr. Charles Hawksley and Mr. Charles Gott, appeared against the Corporation scheme, and in support of the Westgate and Birchington Company's Bill.

After a prolonged hearing, extending over two days, their Lordships threw out the water clauses of the Margate Bill, and passed the preamble of the Westgate and Birchington Company's Bill. This latter Bill, among other things, asked for an extension of district to take in the parish of Acol, as also the part of the parish of Westgate-on-Sea supplied at present by the Margate Corporation. It was contended by the Westgate Company that this part of Westgate-on-Sea was not included within the present limits of the Margate supply, although they had originally purchased it from a Company who had powers over that district; the reason given being that, as the Corporation purchased from the Company under the Public Health Act, they had no power to supply outside their municipal boundary. The Margate Corporation by their Bill sought for power to extend their district so as to cover the ground originally occupied by the Margate Water Company, which would in that event have taken in the ground sought by the Westgate Company. In the decision given by their Lordships, they threw out all the water clauses of the Margate Corporation, including the extension of district, notwithstanding the fact that the Margate Corporation are at the present moment supplying water within the district they were seeking to acquire. Further, they approved the preamble of the Westgate and Birchington Water Bill, which gave them power to take over the part of Westgate-on-Sea supplied by the Margate Corporation by purchasing the pipes and mains comprised in that part of their undertaking, if any. This we think is the first time a Company has ever obtained parliamentary power to carve a piece out of a district watered by a Corporation claiming to be in possession.

The Lords Committee on Wednesday, while passing clauses, distinctly stated that their decision did not alter the status of the Margate Corporation. The interesting legal question therefore remaining to be discussed is whether they have or have not powers over this part of their district outside their municipal boundary—that is to say, whether the powers of the Public Health Act will give them statutory authority outside their district. It may be noted that the Margate Corporation had doubts as to this as, while, on the one hand, they claim the district as belonging to themselves, in their Bill they ask Parliament to confirm their statutory powers over the district. This request the Lords have refused to grant, leaving the Company exactly where they were before they went to Parliament, but the worse off by having their proposed pumping scheme refused, and further leaving them in the unenviable position of having to propose some other and more acceptable way to Parliament for increasing the supply to their district.

The examination and cross-examination of Mr. Valon lasted for some hours; and at the termination of the evidence of the expert witnesses for the Company, it was pretty clear the Lords would decide against the proposed new pumping-station of the Margate Corporation, and, as a consequence, it was anticipated that the district would be refused, seeing that the Margate Corporation had to confess their inability to supply present needs for the restricted area within their borough.

ELECTRIC TRAMWAYS AND GAS MAINS.

The Question of Electrolysis.

A Select Committee of the House of Commons, presided over by Colonel Cotton-Jodrell, recently considered the Bill of the South-Eastern Metropolitan Tramways Company, which had for its object, as it came before the Committee, the substitution of electric for horse traction on the tramway running from Greenwich to Catford. The Bill was opposed by, among others, the South Metropolitan Gas Company whose opposition was based on two grounds—the danger from electrolysis to their pipes and mains, and the desire for the insertion of a clause giving them power to make, at the expense of the Tramway Company, any alterations of their mains that might be required in the laying down of the tramway as an electric one.

Sir W. H. Preece, who gave evidence as Engineer to the scheme, said (in cross-examination on behalf of the Gas Company) that he did not think the mains would be affected by the electricity, as it was proposed to proceed under the Board of Trade regulations, which he considered would protect the Company without the insertion of any special clause. In the result, the Committee passed the preamble of the Bill.

Mr. Castle, Q.C., for the South Metropolitan Gas Company, in proposing clauses for the protection of his clients' mains and pipes, and conferring on them power to carry out all alterations themselves, said the matter was an important one for the Gas Company, who supplied some 50 square miles of London; for there was everywhere a desire to substitute, in the working of tramways, electric for horse traction. What the effect would be on a large scale, of setting these electric currents free all over the place, it was impossible to foresee. The South Metropolitan Company had had cases occurring (especially along the route of the City and South London Railway) of electrolysis, an example of which had been shown to the Committee; and fusion had also taken place between their pipes and the electric wires. Therefore they felt bound to appear before Parliament. It was suggested in one case—the London County Tramways (No. 2) Bill—that the Gas Companies were intruders along the public highways, and that they must take any risk arising from the electric tramways or the user of the public. This was an entirely wrong argument. The sub-soil of the roads belonged to the adjoining proprietors; and all that had been granted away was the user to passengers. The sub-soil was reserved for the amenities of the houses; and therefore it became a question between the user of the public and the user of the inhabitants for their gas, water, and drains. He contended that the Gas Companies were in their proper place, and that anyone interfering with them interfered with the property of the adjoining proprietors. Up to the present, in constructing these tramways it had simply been a question of taking up the surface of the roads; but electric traction involved interference with the sub-soil, and the setting free of currents which would affect the mains by electrolysis, unless they were properly safeguarded. The Board of Trade might make regulations; but they were not sufficient. Sir W. H. Preece had put his hand on what was required—it was not regulation, but supervision from time to time. Accidents would occur here and there. Electricity would escape, pass through moist ground, and turn the water into hydrogen and oxygen, which would attack the iron and change it into plumbago. The damage might amount to thousands of pounds in the case of a large undertaking like that of the South Metropolitan Gas Company, if the Bill passed without a protective clause. Sir W. H. Preece had said there would be no damage in this instance from electrolysis. But, if so, a protective clause would do no harm, but only make the Tramway Company more careful in laying down their system. The works proposed would necessitate a considerable amount of alteration of the Company's pipes and mains; and they desired to be allowed to make such alterations themselves, at the Tramway Company's expense.

Mr. C. C. Carpenter, the Chief Engineer to the South Metropolitan Gas Company, said that, under the Tramways Act of 1870, the Tramway Companies had a right to make such alterations as were necessary to gas pipes and mains; but these powers had never been put into operation, and it would be dangerous if they were. In respect to the conduits for electrical traction, they required a depth of from 2 to 3 feet, and would necessitate interference with the gas-mains. The main that would be affected in this case was a 2 ft. 6 in. high-pressure one. In the case of any alteration to it, personal supervision on his part would be absolutely necessary. Great attention had been drawn in America to the damage done by electrolysis. Mr. W. R. Cooper, an Electrical Engineer, gave evidence as to the effects of electricity on pipes and mains. Mr. James Swinburne said the Board of Trade regulations would do much to keep down damage from electrolysis, provided they were carried out; but with earth returns, it could not be stopped altogether. In America, owing to the absence of rules, electrolysis was much worse than in this country, where low-power currents were employed. Insulated returns would be a perfect protection. He could not see why Gas Companies should not be compensated for damage done to the pipes by electrolysis. A proposal had been made in the United States to substitute earthenware pipes; but it was not found to be practicable. To put insulated returns on tramways was difficult; and if Parliament insisted on it being done, it would cripple the tramway industry more than it would benefit the public. Tramways should be allowed to use earth returns; but if they spoiled other people's property, they should pay for it.

Ultimately, the Committee refused to insert the protective clause asked for by the South Metropolitan Company, but agreed to insert a proviso that the Company should be allowed to do their own work, subject to an arbitration clause.

Lambeth Water-Works Company.—The report of the Directors of this Company for the half year ended March 31 states that the revenue account shows an increase of £5679 in the water-rents, &c., and of £2535 in the expenditure, as compared with the corresponding period of 1899. The principal additions to the expenditure occur under the heads of distribution, pumping and engine charges, salaries of Engineers, &c., and rates and taxes. With the exception of the latter item, they may be attributed to a larger business and to the enhanced cost of coal and other stores. The surplus transferred from the revenue to the dividend and interest account is £85,121. There is to the credit of the latter account, after payment of interest on debenture stock, an available balance of £85,969. The Directors have decided to transfer £10,000 to the contingency fund (which will then stand at £40,000); and they recommend that a dividend of 7½ per cent. per annum be paid on the shares issued under the Company's Act of 1856, and one of 10 per cent. per annum on all the other share capital of the Company; also that a payment of 5s. per cent. (being at the rate of ½ per cent. per annum) be made on all the share capital of the Company on account of deficiencies of previous dividends. A balance of £2015 will remain to be carried forward, after making provision for the payment to be made to the Chamberlain of London in virtue of the sinking-fund clause of the Company's Act of 1886, in respect of debenture stock that has been issued under that Act.

Scarcity of Water at Ashton.—At the monthly meeting of the Ashton Joint Water-Works Committee last Thursday, it was reported that there was a deficiency of 100,298,000 gallons of water in the reservoirs as compared with this time last year. The Chairman (Alderman J. Wilson) said the Committee felt that it was desirable to enforce a restriction in the consumption of water, if they were to be able to give a supply at all in the event of there being a very dry June and July. He would propose—and he thought it would be agreeable to the members generally—that they should shut off the water from eleven o'clock at night until five o'clock in the morning. They could try this for a month, and see what the condition of the reservoirs would be then. He might tell them that until the end of July there were 75 days. If the weather kept as it had been, they would be in a very serious condition. They had altogether in their reservoirs, a week ago the previous night, a little more than 15 weeks' supply, which meant that they could not supply at all at the end of 75 days. Mr. Noel asked if notices could not be sent out to the effect that people wasting water would be prosecuted. The Chairman replied that this would have to be done; someone would have to be punished. It was useless to attempt to save water by restricting the hours of supply if people were to be allowed to let it run to waste. After the notices had been issued, people caught in the act of wasting water by swilling, &c., would be brought before the Magistrates and dealt with. Mr. Noel seconded the motion, and expressed concurrence with all the Chairman had said. The proposition was agreed to.

MISCELLANEOUS NEWS.

EDINBURGH AND LEITH GAS COMMISSION.

Visit of Inspection to the Granton Works.

On the afternoon of Monday last week, the Works Committee of the Edinburgh and Leith Gas Commission paid a visit of inspection to the new gas-works which are under erection at Granton. Mr. Kinloch Anderson, the Convener of the Committee, was in charge of the company. On their arrival at the works, they were received by Mr. W. R. Herring, the Engineer, who showed them round.

Mr. Herring furnished the information that down to April 15 last, the expenditure upon the works in process of construction amounted to £41,739. The gasholder tank, which should have been finished at the beginning of the present year, at a cost of £19,000, has only been completed to the extent of £13,631. The side-walls, however, are constructed; and the stone coping is now being placed in position. At the present rate of progress, the interior of the tank and the completion of the puddle bed over the cone will occupy another three months, at which date the erection of the steel work will commence. The deep-level drainage system, which has been laid for serving the present area being dealt with, has been finished to the point of issue—low-water mark in the Firth of Forth—the total cost being £2390. The residual products works buildings, including the chimney, are now practically completed, at a cost of £3805; and the chemical works plant is being erected therein, the contract price for which, including the boilers, is £8905. Some cast-iron tanks from the Portobello works have been removed, and re-erected upon the Granton site for this portion of the works. The railways existing upon the site are, with slight exceptions, permanently laid, and are sufficient in themselves to cover two complete sections of the works. The total cost for railways, both on the upper and lower sites, is about £5938. The levelling of the site, construction of the foundations for the main buildings and plant, including the culverting of a burn running through the ground, building of boundary walls, &c., account for about £6000. The building of the retort-house, coal-store, plant-house, &c., are well started now, but have been seriously delayed in consequence of the difficulties of getting materials. The buildings are being constructed of brick, with hard red brick facings. The 22 contracts at present in process of execution comprise the gasholder, representing a sum of £43,314, considerable portions of which are already delivered upon the site. The arge girder-roof for the retort-house, 100 feet span, portions of which are also delivered, represents a sum of £10,609. The coal-store roof, constructional steel work, &c., is also well in hand, representing a sum of £16,746, in addition to which the Commissioners have two locomotives, one steam travelling crane, excavating grabs, and steam driven stone-breaker and concrete mixer, 2-feet narrow gauge railway with iron tipping waggons, several 3-yard ballast-waggons for running on the permanent way, as well as a considerable amount of general plant and appliances on the works. A stone quarry has been opened in the Pennywell Parks; and the whole of the materials removed therefrom have been used in connection with the construction of various parts of the works. There appears to be some very good stone in the quarry, although the upper strata have only at the present been quarried. In consequence, however, of the nature of the works in process, all qualities of stone being removed are available for the works—the softer portions being used for the making of concrete; the rougher and harder portions, for rubble work and for ballasting under the roads, railways, and floors; and the larger pieces are being dressed and worked into the structures. There appears to be an abundance of stone beneath these parks, which will no doubt prove of very considerable value to the Commissioners. Mr. Herring pointed out the site of a passenger railway station which it is proposed to erect, for the convenience of the workmen travelling to and from the works. Then the retort-house and coal-store were looked at, after which the gasholder tank, being further advanced, received more attention. The Belgian stone used for the construction of the coping is being received in satisfactory quantities. It is a very tough stone, and most suitable for such work. The tank is being constructed by Mr. W. Wilson, of Hillhead, Glasgow; and the holder will be erected by Messrs. Clayton, Sons, and Co., Limited, of Leeds. The only other portion of the works in existence is the chemical works, situated about 50 yards from the shores of the Firth of Forth. The building is all but completed; slaters being engaged on the roof—in which, by the way, there is no wood, the slates being wired on to iron ribs. Two ammonia stills are in course of construction within the building; and in an annexe are two Lancashire boilers, which are to be fired with producer gas. Outside the building is a tar-tank, nearly completed, and a specially constructed plant for the recovery of sulphur. The chemical works are expected to be in full operation in about three months. It is intended to start them at once, conveying the raw materials by rail, as they are at present and have been for years, to Falkirk. Mr. Kinloch Anderson stated that it had been expected that they would have been able to make gas at Granton in the autumn of 1901; but on account of the delays which had taken place, by reason of want of labour and the non-delivery of materials, they were satisfied that it would be the spring of 1902 before the new works could be started. There was no doubt they would be in a tight place by then; but Mr. Herring's ingenuity had been such in the past, that they need have no fear but that he would be able to cope with it. When once this section of the works was started, the works at Leith and Portobello would be closed and sold; and when a second section of the new works was erected, the Edinburgh works would also be disposed of.

The weather was fine; and a very enjoyable, as well as profitable, afternoon was spent. The visit tended to confirm the view that a more ideal site for a gas-works could not be found. Mr. Herring has taken possession of Granton House, which has just been vacated by Mr. Reginald Macleod, the new Registrar-General for England.

The Llandudno District Council have, on the recommendation of the Gas Committee, resolved to make application to the Local Government Board for sanction to the borrowing of the money required for the provision of a carburetter at the gas-works.

MANCHESTER CORPORATION GAS AND ELECTRICITY SUPPLIES.

Increase in the Price of Gas—Criticism of the Electricity Committee.

At an Adjourned Meeting of the Manchester City Council, held on Wednesday last—the Lord Mayor (Mr. T. Briggs) presiding—the estimates for the current year prepared by the various Committees (*ante*, p. 1238) were considered.

Alderman King, Chairman of the Finance Committee, in introducing the estimates, observed that, in accordance with a resolution of the Council passed on May 2, certain of the Committees had found it possible to revise their estimates, in order to relieve the city rate. The Gas and Electricity Committees now proposed to hand over £51,900, instead of £20,000 as originally estimated. This alteration would, however, involve an alteration in the price of gas.

The Lord Mayor (Deputy-Chairman of the Gas Committee) moved the adoption of the revised gas estimates. These involved an increase in the price of gas to consumers by ordinary meters (including public lamps) of 3d. per 1000 cubic feet, to take effect from June 24 next. This would enable the Committee to hand over £51,900 to the city fund, instead of £20,000, as originally estimated.

Alderman Rushworth seconded the motion. It was, he observed, only right to say that the decision to advance the price of gas was arrived at by the Committee in the absence of the Chairman (Alderman Gibson), whom they were glad to see present that day. He would like to give a few reasons for the necessity of the increase in the price of gas. Some criticism had been passed on the Committee on account of what was termed its "hand-to-mouth" policy; but he could tell them that the Committee had secured every ounce of coal and cannel obtainable. One of the causes of the increase in the price of gas was the extra cost of coal and cannel. Judging from the information supplied to him, it was a matter of grave doubt whether the increase of 3d. per 1000 cubic feet would meet the case; but that was only his own view. He would remind them that the gas-works were the property, not of the consumers, but of the ratepayers of the city. He had, however, every possible sympathy with the supply of gas at the lowest possible price, and the encouragement of its use for cooking, motive power, and other purposes; and when the time arrived, he would be the first to advocate a reduction. But at present, the only course they could pursue was to increase the price.

Alderman Gibson said he occupied a somewhat painful position, in that he had to oppose a resolution passed by his own Committee. He only placed himself in this position from a keen sense of public duty, and a firm belief that if the course recommended were adopted, it would prove quite an unnecessary and serious drawback to the best interests of the undertaking. The resolution was passed by the Committee when he was away from home, and, he thought, under a misapprehension. He believed that if his colleagues had known that he could not possibly be at the meeting, they would have adjourned their consideration of the matter for a few days. He would then have been able to give them the explanation he now had to furnish to the Council. In the first place, he might say that he was, and always had been, of the opinion that they had no right to tax one class of the community for the benefit of another. They had been doing this for years in the gas undertaking. He was quite aware that, in making this statement, he laid himself open to the taunt: "If that is your opinion, how is it that you have so long quietly acquiesced in the position which you now so thoroughly condemn?" He would tell them the reason. When 1d. per 1000 cubic feet of gas was about equal to 1d. per pound on the rates, and when the large ratepayers were also the large gas consumers, he thought it was nearly as broad as it was long—or at any rate, that the small difference involved would not be enough to make any trouble about. But the position was to-day a totally different one. The large ratepayers were not now the large gas consumers, as they were four years ago. They were at present the large electric light consumers; and what was proposed was, unquestionably, to tax the gas consumers by making them pay 3d. per 1000 cubic feet more than they should pay, in order to take 3d. per pound off the rates of these rich men who did not burn gas. For these rich men he was not concerned to legislate. He wanted to legislate for the poor; and he said that, in raising the price of gas to-day, without any necessity—if there had been any necessity, it would have been quite another thing—they were taxing the poor shopkeeper, who was already overburdened with what he had to pay. What, too, about the penny-in-the-slot customers? They had 30,000 last year. They spent a great deal of money in altering the slot-meters to give 30 cubic feet for a penny, instead of 25 feet. What were they going to do now? (A Voice: Leave them as they are.) He wanted someone to tell him that; and he now knew they were going to do something worse than all. These people, to all intents and purposes, were not ratepayers. (A Voice: Yes.) Well, they might be, indirectly, but not in the sense that shopkeepers were; and they would not be affected in the same way. They were going to continue giving them the advantage of 30 cubic feet for a penny; and they were also giving the rich people an advantage, who did not burn gas. The whole weight would be placed on the middle-class—the shopkeepers, &c. Then, again, what about gas for power purposes? In 1896, when the price of gas was reduced 3d., he told them that the business would go up by leaps and bounds. In that year, there were 962 engines using their gas. To-day there were 1662, or nearly twice the number. The people who had these gas-engines were mostly in a small way of business; and they had no right to relieve those who did not want relief, at the expense of such men as these. With regard to cookers, he might mention that in 1896, when the price of gas was reduced, there were 3781 cookers and heaters; to-day there were 9560. It had been said that if they did not raise the price of gas this year, they would have to do so next. Let every tub stand on its own bottom. They would know how to deal with the question when the time came. If they could not produce gas at the price, the price would have to be raised; but that was not so to-day. They could make gas just the same as before, with £10,000 profit. They had no justification for raising the price; and he strongly urged the members to agree to his amendment, which was that the estimates submitted to the Council on May 2 should be adopted. Then there was another point that had escaped the attention of his colleagues when they passed the resolution. A Municipal Trading Committee had been formed in the House of Commons,

with the consent, he believed, of Mr. Balfour. Why had it been formed? Because there were a number of members of the House who said that municipal trading was not pursued for the benefit of those who were served, and that the profits were used for bolstering up the rates of the city. They further said that the tramway, gas, and other undertakings were all vying with each other as to which could gain the most popularity, not by the way in which they served their customers, or by charging them the lowest price, but by making the most profit out of the undertaking, in order to pay it over to the rates. They said this was wrong; and he held the same opinion. They had no right to pay anything at all out of profits towards reducing the rates. The Committee was formed to prevent, as much as possible, municipalities from becoming trading committees. The argument was that the fact of their paying these sums to the rates went to prove that private competition could do better for the people than municipalities. Supposing he were called before the Committee, and were asked if the Manchester Corporation had raised the price of gas because they could not supply it at less, he would have to answer: "No. We could do it, and make £10,000 profit." "Why then have you raised the price?" He would have to reply that they had done it simply in order to be able to hand over so much to the rates. This would settle the whole business. They would not want another witness after that. If, therefore, they passed the resolution, they would do great injury to the undertaking and to the community, and to a number of other local administrations, because they would show that it was not for the consumers' benefit they wanted to work the departments, but in order to pay money over to the rates. The little benefit they might bestow on the rich people who did not burn their gas, would be more than counterbalanced by the great injury they would inflict on the poorer classes of the people who did burn gas.

Councillor Lambert seconded the amendment. His first reason was that he did not think the matter should have been decided in Committee in the absence of the Chairman. The Committee arrived at the decision under a misapprehension. They had since learnt that the Chairman, who had been in London, only received notice of Friday's meeting late on Thursday night; so that it was impossible for him to attend. He therefore thought the Chairman and other members should have an opportunity of considering the matter together. In the second place, there was a good deal in what Alderman Gibson had set forth. He contended that the principle the Chairman had advocated was a sound one—that consumers were entitled to be supplied with gas at a price as near as possible to the cost of production, having due regard, of course, to the interest, sinking fund, and reserve fund; and that it was not fair or justifiable to charge a high price for gas in order to contribute a substantial amount to the city fund in reduction of rates. The most important point touched upon by the Chairman was the last. At the present time, there was sitting in London a Committee who had under consideration the Lancashire Electric Power Bill, which was promoted by private individuals in London for the purpose of supplying electricity to the whole county of Lancaster south of the Ribble, in competition with the municipal authorities. Their strongest argument was that they could supply the article cheaper than municipalities could do, because the latter were not furnishing it at cost price, *plus* a fair margin of profit, but at a price which would enable them to pay so many thousand pounds annually in reduction of the city rates. This argument might be applied to other departments of enterprise; and for this reason he thought they should hesitate before raising the price of gas.

Alderman Thomson, who opposed the amendment, said they ought to look for a moment at the history of the gas-works. When real property devolved on a man, certain moral and perhaps legal obligations rested upon him. He was bound to keep it in repair, and develop it to the best of his ability. Many years ago the Council inherited a very valuable property—the gas-works. These were established before Manchester was incorporated; and when that occurred, they took over the responsibilities of the undertaking that had been carried out by the ratepayers under the Lord of the Manor. It was for the use of the ratepayers; and they were bound to develop the property to the best of their ability. When the property was handed over to the Manchester township, it was considered right and lawful that the town should receive a profit of 10 per cent.; and they had that right now. Of course, if a new town went to the Government, and asked for powers to make gas to-day, they would probably be told the conditions were different, and that only a profit of 5 per cent. would be allowed. Still the right to make a profit was recognized. He did not like to hear Alderman Gibson dividing class against class. He would also say that if they were doing wrong by getting a profit on the gas, because it was bad for the shopkeeper, they ought also to increase the rate for electric lighting. He would be sorry to say a word that would pain the shopkeepers, or any other class of the people; but this was a matter of ordinary economy. If a man in business was passing through times when everything else was raised in price, he must try to increase the price of his own goods as well. This was precisely the position of the Gas Committee. He had looked with alarm at the last reduction. He thought it dangerous, and that the time would soon come when they would have to raise the price again. He supported the Gas Committee's recommendation, which he considered a sound one.

Councillor Plummer observed that the position of the Chairman reminded him of "Athanasius contra mundum." He was not only against his own Committee, but against the Council, and, what was more, the outside public. They all had the highest respect for Alderman Gibson; and generally he found himself on the same side. But he had never heard him present a weaker case than that which he had put before them that morning. With regard to the effects of the increase, those who paid the highest rates would find a distinct relief, and not any imposition. It was impossible to adopt a measure of this kind without pressing on a few individuals; but they must take the general sense of the community. The number adversely affected would be small, compared with the general advantage. With regard to the Committee on Municipal Trading, he thought the House of Commons, or any other sensible Committee, ought to take the instance mentioned by Alderman Gibson as favourable to municipal trading. They were proud of the Manchester gas undertaking; and he gladly recognized the good work Alderman Gibson had done as Chairman. Time after time, the Chairman had pointed out, with pardonable pride, the splendid financial basis on which it rested. Were not the ratepayers, then, entitled to interest on the money invested in it, at least at the rate of 5 per cent? The Chairman came before them to protest against this interest being given, on the ground that they should work as near as possible to the cost price. What about the £50,000 last year? They were simply seeking to contribute an equal sum to-day, and were asking for 3d. per 1000 cubic feet more to cover the cost of material. If there was anything in the argument about working to cost price, they ought never to have had the £50,000 before. Looking at it from a business point of view, they were, in the first place, entitled to interest on the investment; and, in the second place, they were not seeking to make any more surplus than before. It was purely a defensive measure; and he thought the Council would, with practical unanimity, support the action of the Committee.

Sir Bosdin Leech remarked that, when the last reduction was proposed, he was in opposition, on the ground that, though times were then favourable, coal being at a low price, they should not hurry matters, as coal would go up, and they would then want to raise the price of gas. There was a good deal to be said on the principle of everyone bearing his own burden. The gas consumer might think it an injustice that he should have to pay something which was a burden that ought to be borne by the ratepayers as a whole. In many ways, however, the rich man was taxed when the poor man was absolved. They could not lay down an absolute rule. Alderman Gibson said it would be a hardship to users of cookers and engines; but was it not a greater hardship that, while the man who had a gas-engine was getting his power at a price which was an absolute loss to the seller, his neighbour using steam, had to pay a big price for his coal? The same remark applied to users of gas for cooking, and those who employed coal-fires. It was only fair that they should meet the circumstances of the day, and put on again what he held at the time was wrongly taken off. The citizens stood all the loss and risk, so far as the gas-works were concerned; and they would have to bear the burden in the case of any accident, like that at Rochdale Road. The Gas Committee were taking a wise step. He knew the Chairman worked very hard in the Committee; but he was entirely wrong in this matter.

Councillor Wainwright suggested that the Electricity Committee should be asked to increase the price of current; but the proposal was ruled out of order.

The revised gas estimates were eventually adopted; only 4 votes being recorded in favour of the amendment proposed by the Chairman.

Considerable discussion took place on the motion to adopt the revised estimates of the Electricity Committee. In the original estimates, no contribution to the city rates was anticipated by the Committee; but in the revised estimates, provision was made for handing over £4000 in relief of the rates.

Councillor Lambert moved, as an amendment, that the original estimate be adhered to. If the Chairman of the Committee, who was attending to his duties in London, were present, he was sure he would object to the proposed payment of £4000 from the reserve account. The Committee at present had a ridiculously small reserve. They were entitled to a reserve of £66,000. This time last year it was about £32,000. During the twelve months, it had been drawn on to the extent of £20,000, which reduced it to £12,000. If they drew on it for a further £4000, the remainder would be quite inadequate to meet any sudden emergency. If they had any serious breakdown to make good, the whole of the reserve would be swallowed up.

Dr. Bishop, in seconding the amendment, described the proposal of the Committee as due to what might be called "panic legislation." This £4000 profit had been arrived at by increasing the estimated increase in consumption during the twelve months. But the original estimate had been made on the widest possible basis; and to go and increase it so as to produce on paper £4000 extra, was to put the matter on a false basis altogether. It meant that they would have to dip into the reserve fund. They had now £10,000 reserve; and the deduction of £4000 would leave them with only £6000. If they had another breakdown such as they had had during the past twelve months, where would the reserve fund be? He thought the Chairman (Alderman Higginbottom) should have been at the meeting of the Committee. [The Lord Mayor: He is in London on municipal business.] Well, they had adjourned the meeting to the Saturday, to suit his convenience. He (the Chairman) was not before the House of Commons on Saturday. He was sorry the Chairman was not present that day. These estimates were the most important business of the year, and he thought when the Chairman did not attend he should be called on to explain. What prevented them paying over anything was the increased interest and sinking fund, amounting to £39,880. It would be interesting to know how much of this should be allotted to work carried out or about to be carried out in out-districts, and to that carried out in the city itself. From figures he had before him, he might state that in three districts alone—Moss Side, Levenshulme, and Withington—they had spent £33,926, and only received £285 in return.

The Lord Mayor: Things are not fully developed in the department. They are in a state of transition.

Dr. Bishop asked how long they were going to be in a state of transition. Last year they paid £10,000; now they were able to pay nothing. Was this the kind of transition they liked to see in any Committee?

The Lord Mayor: Please adhere to the estimates.

Dr. Bishop said that, as a member of the Committee, he ought to know whether they were in a state of transition. Even allowing for that, they should be able, after spending £650,000 on the undertaking, to hand over £4000 without trenching on the reserve fund. The financial condition of the department was such as to require strict investigation. It was not on a sound financial basis; and he did not think the Council should give their consent to the course proposed. There was a lack of administrative ability in the Committee. There was far too much of the "station" element. There was too much done that the department knew nothing about. The Deputy-Chairman himself did not know one-half of what went on. There was a requisition book used at the station; that book was never presented to the Committee. Money was squandered in a ridiculous manner.

Councillor Hampson also thought there was either great incompetency in the management or bad administration; and there ought to be an end to it. When they looked at the large amount spent on the undertaking, and then at the lack of profit, there appeared to be something wrong. The current had been carried a great distance in some

directions, with only a very small result; whereas if it had been taken to other districts that were neglected, the return would have been many times as great. At the last meeting of the Council, the Chairman had told them the Committee had since 1893 paid £68,000 to the city fund, and built up a reserve of £40,000 out of the profits of the undertaking. Now he had been looking up the figures, and found the actual amounts were £48,963 and £23,206 respectively.

Alderman RICHARDS said he had thought at the time that the Chairman's statement was not accurate. He hardly knew how to vote. A sum of £4000 would not help the rates much. He hoped they would set their house in order. What they made in the city, they lost in the out-districts.

Alderman SOUTHERN said Alderman Higginbottom was absent on very onerous duties in the interests, not only of Manchester, but some thirty other towns in Lancashire. He thought it wrong to attack an absent colleague, as Dr. Bishop had done. When that absence was caused by devotion to their interests, it was not only wrong but despicable.

Dr. BISHOP: I ask for that word to be withdrawn. Alderman Southern has forgotten himself.

Alderman SOUTHERN: Oh, dear, no. It is despicable.

Dr. BISHOP asked for the ruling of the Lord Mayor, who observed that the expression was rather strong.

Alderman SOUTHERN: Well, then, it is very much to be regretted. Alderman Higginbottom was acting in opposition to measures by which the interests of municipalities would be seriously injured; and some amount of thanks was due to him, rather than animadversions. If it were desired to criticize the administration, the proper course would be to put a resolution on the notice paper, and have it discussed in a formal manner, in the presence of those whose conduct was animadverted upon. It was also hardly fair to ignore the explanation given by the Chairman at the last Council meeting, with regard to the out-districts. The Chairman had said that the Committee could find £10,000, but did not want to. He (the speaker) thought they might very fairly accept the present proposal.

Councillor WAINWRIGHT observed that the financial department and the works were not in touch, as they should be.

Councillor BAX supported the resolution. He was not satisfied with the work of the Committee; but he did not think the present occasion was opportune for discussing it.

Councillor BOWES, Deputy-Chairman of the Committee, regretted that personal topics had been introduced. The Chairman had fully explained the matter of the large expenditure on the out-districts, which had so far produced no return. Perhaps this time next year they would be in a better financial position, and there would be good results from the work of the Committee.

The estimates were ultimately adopted.

BIRMINGHAM CORPORATION GAS DEPARTMENT.

Railway Rates—New Water-Gas Plant—Annual Accounts.

Several matters of interest are dealt with in the Gas Committee's annual report to the Birmingham City Council.

There is first a long reference to the question of railway rates. The Committee, it appears, have for some time been anxious to secure a reduction of the rates charged for the carriage of coal to their various gas-works; but as the most oppressive of the increased rates were not paid directly by the Committee, but by the coalowners from whom they purchased, the power of appeal to the Board of Trade or the Railway Commission was considerably limited. The Committee endeavoured to obtain the co-operation of the coalowners, but without general success, as the owners were already in association for the purpose of obtaining relief, and were unable to engage in further proceedings. Their efforts were, however, mainly directed to the indirect increase of rates by the alteration of the weight carried from 21 cwt. to 20 cwt. per ton. The Committee were thus debarred from raising the more serious question to them of the withdrawal of the rebates. It has, they add, recently appeared in proceedings before the Railway Commissioners that rebates on coal delivered in large quantities are still in force in other districts. Two firms consented to join the Committee in an appeal to the Railway Commissioners on the question of deductions from rates in respect of coal dealt with on the private sidings of the department. Applications were thereupon filed against the London and North-Western and the North Staffordshire Companies jointly for a uniform allowance of 3d. per ton on all coal dealt with on the Windsor Street siding, and against the Midland Railway Company for a similar allowance on coal dealt with on the Saltley siding. The grounds of the application were that the rates to the public wharves at Lawley Street and Windsor Street, which must include a charge for terminals, and to the private sidings of the department were the same. The London and North-Western Railway Company assented to the reduction as regarded Windsor Street, and the application was accordingly withdrawn. The Midland Company, however, not only opposed the application, but also obtained the appointment of the Railway Commissioners as arbitrators to determine what allowance was due to them for special services rendered in connection with the transfer of the coal to the Corporation siding. On the case being heard, Mr. Justice Collins decided that it was incumbent upon the Corporation to show that there was a station charge included in the Saltley rate; and that inasmuch as they were unable to adduce this evidence, the application failed. In this decision, the Committee say, the learned Judge does not seem to have been in agreement with his colleagues; but the members of the Court were unanimous in deciding that the special services rendered by the Company were equal in value to the amount of any rebate to which the Corporation were entitled in respect of their private siding, and that consequently the application must be dismissed. Subsequently it was found that in the case of coal carried from the Derbyshire district to Windsor Street by the Midland Company, no siding allowance was being made, though the Company did not render any services in connection with the siding. In conjunction with the coalowners who had paid the charge, an application was made for an allowance of 3d. per ton, and also for damages in regard to excessive charges on coal already delivered. The Company, after a delay of some months, reduced the rates, but declined to admit that it was in respect of siding allowance or to make it retrospective. An appeal to the Railway Commission for damages was accordingly lodged, and also for a revised through rate. The latter application was made because it was ascertained that the reduced charge was 4s. per ton to Windsor Street, a distance of 74¼ miles, against 3s. 9d. from the same pits to Lawley Street—a distance of 77¾ miles. The Commissioners upheld the application for damages. The second application, however, failed; the Court holding that as in the one case the coal travelled over three different railway systems, and in the other over two, the difference was justified. With regard to coke the Committee petitioned the Board of Trade against the rates on that sold for fuel for cement ovens, and the Assistant-Secretary of the Board of Trade, who heard the evidence, intimated that it was a case of compromise. The Companies therefore offered a reduction of 3d. per ton, and agreed that the question of further allowances should rest on the decision of the coalowners' application concerning the reduction of weight allowed from 21 cwt. to 20 cwt. per ton. As the decision was in favour of the coalowners, further relief was gained; and subsequently reductions followed in most of the other rates for coke. The financial result to the Corporation has been that £1818 has been received in respect of over-payments. Of this amount £349 has been paid to customers who bought coke under contracts subject to rebate if the reduction were obtained, and £695 was absorbed by law costs—leaving a net gain to the Corporation of £774. In addition, customers who have paid their own rates have recovered various amounts. The annual gain to the department, the Committee say, will vary. On the annual traffic since the charges have been made, it has probably varied between £3500 and £4000 a year. This, however, is not more than one-third of the estimated annual burden placed on the undertaking by the increased rates and the withdrawal of rebates.

Dealing with other matters, the Committee state that they had very great difficulty in maintaining the gas supply, especially at the Saltley and Swan Village works, during the winter months, owing to the inability of the Midland Railway Company to deliver in December the coal which had been purchased. When the difficulties of the railway had been overcome, the Committee were, fortunately, able to rely on the assistance of most of the colliery proprietors with whom they had contracts for the prompt delivery of the coal in arrear. There were, however, a few exceptions; and the Committee, in order to secure supplies in January and February, had to make additional contracts for periods extending to June 30, and under which upwards of 4000 tons of coal have been bought, at a price considerably in advance of the contract price for the financial year. It has become apparent that, with a liability to a sudden breakdown on the part of the railway companies in the darkest portion of the year, the punctual delivery of the coal purchased for the year's supply can no longer be relied on, and that, in order to prevent a recurrence of the serious circumstances under which the Committee have been placed in the past winter, it is advisable to provide carburetted water-gas plant at the Swan Village works, which can be resorted to in a time of emergency, in aid of the coal-gas supply. It has been decided to take immediate steps for the provision of this plant, in order that it may be ready for use next winter if it should be required; and the Committee have authorized an expenditure of £15,000 at the works on generating and storage plant, capable of producing 1½ million cubic feet per day. They have accepted the following tenders in connection with this expenditure: Messrs. Humphreys and Glasgow, generating plant, £7896; Messrs. Clayton, Sons, and Co., oil storage tank, £1279; Messrs. Whitehouse and Sons, buildings, £4125. The Committee have had under consideration the increasing trouble which has been experienced during the last few years, in the summer months, from the presence of naphthalene in the mains and service-pipes. Mr. Hunt is of opinion that the difficulty may be overcome by the more effective condensation of the gas at the works in those months; and the Committee have authorized an expenditure of £2170 in additional condensing plant at Windsor Street, and have accepted the following tenders for the work: Condensing plant, £1135; and pumps and engines, £525.

Among miscellaneous matters, the Committee state that they have purchased an additional quantity of coal for delivery to the Windsor Street works in the summer months, to replace stocks which have been heavily drawn on in the winter, owing to an unusually large increase in the output. They also report that 56 army reserve men have been called up to service from the employment of the department. In order to preserve their status under Part 2 of the Superannuation Scheme, leave of absence has been granted to these men. Six of them have since returned to work, three on furlough, and three rejected as unfit for service. Assistance is being given to the families of twenty-four men who have been permanently employed by the department, and whose families are in need of assistance. The Committee recommend that the salary of Dr. Colman, Chemist at the Saltley works, be increased as from the 1st ult. to £400 per annum. He was appointed in September, 1892, at a salary of £300 per annum, which was increased to £350 in 1897. Since that time very large additions have been made to the chemical duties he is called upon to perform, and additional manufacturing operations requiring his attention and knowledge have been introduced.

The Committee also submit their balance-sheet and statement of accounts for the year ended March 31 last, showing a profit amounting to £29,821. They recommend that this amount shall be appropriated to the improvement rate of 1900. If this recommendation is approved, the contribution for public purposes from the gas undertaking for the year ended March 31, 1900, will be as follows: In aid of the improvement rate of 1900, from profits, £29,821; in aid of the improvement rate of 1900, interest on reserve fund, £4000; in aid of public lighting within the city, £10,579; in aid of lighting of courts within the city, £2388—total £46,588; and in aid of public and court lighting outside the city, £3490 16s. The cost of repairs to meters for the year has been £6084, and the number repaired 8925.

GAS PROFITS AND PRICES AT HUDDERSFIELD.

At last Wednesday's Meeting of the Huddersfield Town Council, the Gas Committee reported that the surplus balance from the gas-works for the past year was £10,072. The sum of £3433 had been devoted to the relief of the borough rate (equal to a rate of 2d. in the pound), and £6639 to the reduction of the reconstruction account. Alderman Stocks,

in moving the confirmation of the recommendation, said these figures did not by any means show the whole of the profits made by the works. The gross profit was £20,710; and out of this £10,640 had been paid for various purposes. Referring to the great advance in the price of coal, he observed that they consumed somewhere about 63,000 tons of coal a year. So far as they could infer, they would have to pay something like 5s. a ton more for the coal; or a total of between £15,000 or £16,000 in excess of the past year. He did not wish to raise the price of gas generally if he could help it; but he saw no other chance for supplies for heating and motive power. The gas for these purposes might be advanced by 3d. or 4d.; and with this increase and the higher price of residuals, he hoped they would be able to do without a rate-in-aid. Mr. Beaumont suggested to Alderman Stocks the advisability of the Committee conferring with other corporations as to the desirability of corporations acquiring collieries of their own. Alderman Stocks, in reply, said the Committee were quite alive to this question; but it was not fitting that they should show their hand. The Committee's recommendation was adopted.

HULL CORPORATION GAS AND WATER SUPPLY.

The Annual Accounts—The Sale of the Old Gas-Works.

At the Meeting of the Water and Gas Committee of the Hull Corporation yesterday week, the City Treasurer and Accountant submitted the revenue accounts of the water and gas undertakings for the year ended March 31. The former showed (after meeting working expenses, city fund annuity, interest and sinking fund charges) a net credit balance of £11,809. The gas undertaking (after providing for the expenditure on cookers and prepayment meters and fittings) showed a gross profit of £4902, out of which interest and sinking fund charges (£3738) had been met; leaving a net credit balance of £1164, and making, with £2510 from the previous year, £3674. The Chairman (Alderman Massey), in moving that the amounts be applied to the reduction of capital, observed with regard to the water-works that last year the Council commandeered £6000, and in the coming year they would take £7000. Somebody had kindly proposed that they should have a reserve fund of £5000; and this would take all they had got. The resolution was adopted.

A Middlesbrough firm have purchased from the Hull Corporation the remaining plant at the old Kingston-upon-Hull Gas-Works; the price paid by them being £1825. The money has already been handed over; and the work of dismantling is proceeding. The purchasers have three months in which to remove the plant and buildings. Sales previously effected included purchases by the Mirfield and Maidenhead Gas Companies and a firm at Hull. Above £420 was received from these sources.

HEYWOOD CORPORATION GAS SUPPLY.

The Past Year's Working.

The Engineer and Manager of the Heywood Corporation Gas-Works (Mr. W. Whatmough) has presented his report on the working of the undertaking in the year ending March 31 last. It shows that the gross revenue amounted to £20,681; and the gross expenditure (less interest and sinking fund), to £14,209—leaving a profit of £6472. The net profit amounted to £1767, which the Gas Committee have decided to dispose of as follows: To the profit and loss account, £767; contribution in aid of the rates, £1000. The receipts for gas sold for all purposes amounted to £15,982; being an increase of £473. This amount would, he says, have been considerably larger but for the reduced price of gas (which was in force for the whole of the twelve months, as against six months of the previous year), and for the earlier taking of the indices of meters in consequence of the alteration of the discount day. The total amount received for residuals was £4445, or £1030 more than in the year 1898-9, due to the increased amount realized from the sale of coke, tar, and sulphate of ammonia. For coal and cannel there was an increased expenditure of £989 14s. 6d., consequent upon the additional quantity used and the higher price which had to be paid. During the year, 1320 tons of cannel and 11,131 tons of coal were carbonized; the gas made per ton of coal being 10,097 cubic feet. The percentage of cannel used was considerably higher than in the previous year, due to the decision of the Committee to improve the quality of the gas. The total bulk of gas manufactured was 125,724,000 cubic feet; being an increase of 7,079,000 cubic feet, or 5·97 per cent. The total quantity sold was 114,685,017 cubic feet—an increase over the year 1898-9 of 5,197,406 cubic feet, or 4·75 per cent. The gas consumed by prepayment meters again showed a considerable increase; the total amount collected being £339 14s. The quantity of gas not accounted for was 10,232,383 cubic feet, against 7,735,789 cubic feet in the previous year; representing a leakage of 8·13 per cent., as compared with 6·52 per cent. for 1899, or an increase of 1·61 per cent., due to the indices of the meters being taken earlier this year in consequence of the alteration of the time for the payment of accounts. The maximum quantity of gas delivered in 24 hours was on Dec. 16, being 922,000 cubic feet, as compared with 832,000 cubic feet in the preceding year; showing an increase of 90,000 cubic feet. The minimum quantity delivered was on May 29; being 88,000 cubic feet, as compared with 86,000 cubic feet in the year before, or an increase of 2000 cubic feet. Mr. Whatmough states that during the past year the policy of selling a good reliable burner at the small charge of 1d. each answered very well; the total number disposed of being 5596. In most cases, as is well known, the cause of complaint arises either from defective fittings or bad burners; and the large number of burners sold shows that the action of the Committee has been appreciated. The sale of Welsbach incandescent burners was also adopted during the year; the total number disposed of amounting to 73. It is satisfactory to find that the demand for grillers continues to grow; the total number of stoves and grillers in use being now 2504, or an increase for the year of 271. Gas smoothing-irons became very popular in the past year; the number employed having increased by 323. During the dark weather of last winter, portions of the plant were utilized to their utmost capacity; but Mr. Whatmough was able to keep up a satisfactory supply of gas. He informs his Committee, however, that if the consumption continues to increase at the same rate as in the past year, it will be necessary at no distant date to make further extensions, in order to meet the requirements of the consumers.

LEAMINGTON PRIORS CORPORATION AND THE GAS-WORKS.

An Offer to Purchase.

At the Meeting of the Leamington Town Council on Monday last week—the Mayor (Mr. J. M. Molesworth) in the chair—the General Purposes Committee presented a report in which it was stated that the Gas-Works Purchase Sub-Committee had reported on the matter submitted to them, and had recommended that an offer should be made to the Leamington Priors Gas Company to purchase their undertaking for the sum of £140,000, and that Mr. Thomas Newbigging should be appointed Arbitrator. The recommendation had been adopted by the Committee with one dissentient.

The Mayor having moved the adoption of the report,

Alderman Bright said he had to move an amendment, which he did with considerable regret and with some anxiety. He was the one dissentient who voted in Committee against the adoption of the report; and he desired to give his reasons for dissenting. The Sub-Committee recommended that the sum of £140,000 be offered to the Gas Company for their undertaking. This was staggering. A great portion of his income was derived from freehold properties in Leamington; and the Sub-Committee proposed to mortgage this at market value for the purpose of buying the concern, which, in his opinion, did not offer the slightest chance of profit. When Mr. Newbigging was recently at Leamington, he (Alderman Bright) asked him whether, with the price of coal going up as it was, he still held out a hope of profit; and he replied very guardedly to the question, and added that he felt that the Council must at once advance the price of gas 6d. per 1000 cubic feet. Why should they go into this business? If the Council gave £140,000 for the concern, the inhabitants would not only have the price of gas raised immediately, but very likely their rates also. If the charge for gas was increased, the result would be that people would take the electric light. Where would the Council be then with their expenditure of £140,000 of public money? He did not think the price of coal would improve—in fact, he believed it was going to be worse. He was of opinion that it would be better to let the Gas Company go on.

The Mayor (interposing) said it was not in order for Alderman Bright to discuss the general question of the purchase of the gas-works after the Council had passed a resolution upon it.

Alderman Bright (continuing) said he thought that £140,000 was infinitely too large a sum to pay. If the concern were purchased at this figure, the Council would greatly regret it; and when the necessary rise in the price of gas took place, the ratepayers of Leamington would repent it. He would move as an amendment, that the confirmation of the clause in the report relating to the purchase of the gas-works be deferred, and that the Committee be requested to confer with the Gas Company with a view to the withdrawal of the Council's notice to purchase. He said he believed the shareholders would be very glad if the Council would do this. He should strongly urge them not to be rushed into an expenditure which would cripple their funds for years to come, and possibly increase the rates, which were growing fast enough now.

Mr. Heath Stubbs seconded the amendment.

Alderman Wackrill pointed out that if the Council were going to adopt the second portion of the amendment, it was altogether out of order.

The Town Clerk, on being appealed to on the point, said that, having passed a resolution to purchase the gas-works, the Council could not get rid of it without the sanction of the Gas Company. As he understood the amendment, it had nothing to do with the purchase, but was a proposition to put back, at all events, the offer of £140,000 for the gas undertaking.

The Mayor ruled the second part of the amendment out of order.

Mr. Heath Stubbs expressed regret at the course the Mayor had found it necessary to take, but said he would second the portion of the amendment which was in order. It appeared to him that the Council should proceed very carefully in the matter, and hesitate before they made an offer to the Gas Company which would place the town in some financial difficulty. In October, when the matter was before the Council, Alderman Wackrill said that if they purchased the gas-works they would be able to make some thousands of pounds of profits, and carry them to the credit of the rates. Would Alderman Wackrill repeat that statement? Would any man on the Council say that if they acquired this concern they would have the remotest chance of carrying a penny profit to the rates? They all knew what had happened. There had been an extraordinary rise in the price of coal; and they did not know what would be the end of it. Surely, prudent men would pause if they found they might be drifted into a bad bargain. The Council would be bound to purchase if the Gas Company held them to the contract; and they were bound to go to arbitration if they could not agree as to terms. They were told that the rise in the price of coal would necessitate an increase of 6d. per 1000 cubic feet in the charge for gas. If they added to this whatever they might have to pay as an instalment off the loan, it would be a very heavy sum. They would have to pay at least £2000 or £3000 a year in excess of the profit which the Company now made. He should strongly advise that the Sub-Committee should ascertain the feeling of the Company as to allowing the Council to withdraw their notice of purchase.

Mr. Yates appealed to the Council not to be frightened. He reminded them that Birmingham made £20,000 a year out of their gas supply, and that Manchester and many other towns owned the gas-works.

Mr. Fell said Alderman Bright cut the ground from under his own feet when he said the shareholders were not anxious to sell. This was the more reason why the Council should buy. He hoped, therefore, they would endorse their own act.

Alderman Wackrill said if they did not make an offer they would have to go to arbitration. He pointed out that the property was capable of great development, as not half Leamington used gas.

Alderman Bland said he felt very frightened about this purchase, and he thought, if they could, the best thing would be to honourably back out of it.

Mr. NORRIS considered it was too late in the day to buy the gas-works. It was unlikely, he said, that the Gas Company would accept the Council's offer; their price being very much greater. If the difference was split, and it cost the Corporation between £150,000 and £160,000, they could not make the thing pay.

Mr. OVERELL remarked that the Council spent half their time in coming to one conclusion, and the other half in reversing their decision. They had come to a conclusion on the matter of the gas-works purchase; let them go on with it.

On the amendment being put, it was lost by 10 votes to 12. On the result being announced,

Alderman BRIGHT remarked that it was the worst day's work the Council had done for some time.

ELECTRIC LIGHTING NOTES.

After very mature consideration, the Cardiff Corporation have decided to erect an electricity generating station for tramway traction as a distinct undertaking from the lighting department.

The Lewes Town Council last Tuesday affixed the corporate seal to a deed of transfer of the "powers, duties, liabilities, and works" under their Electric Lighting Order, to the County of Sussex Electrical Power Distribution Company, Limited.

As the result of the working of the Shrewsbury electric lighting undertaking during the past fifteen months, a "profit" of £680 has been earned; but the amount required for the sinking fund is £1448. The sanguine Chairman of the Lighting Committee expects to be able to make sufficient profit during the present year to meet this sum.

The abortive attempt of the Oswestry Town Council to acquire the electric light undertaking has cost the town £251. One or two cheerful councillors look upon this as money well spent, seeing that it has (so they think) had the effect of stirring up the Gas Company. The ratepayers, however, may not regard the matter in the same light.

A Local Government Board inquiry was held at Accrington on Tuesday respecting an application by the Corporation for power to borrow £26,250 for electricity purposes. The scheme, upon which £11,736 has already been spent, is a combination one for the production of electric light and power and a refuse destructor. The sum so far borrowed is £18,000; so that the estimated cost will be above £44,000.

The Sunderland Corporation are proposing to build a new electric lighting station; and they have applied to the Local Government Board to sanction the borrowing of the money required for the purchase of the necessary land—viz., £4500. The estimated net profit on the undertaking this year is £500, after paying £3000 for interest and sinking fund. There was no opposition at the inquiry held last Tuesday.

Mr. F. H. Tulloch sat at Ilkeston last Friday to hear evidence with regard to an application by the Corporation to borrow £18,271 for electric lighting purposes. As usual, estimates were laid before the Inspector to show that, in a very short time, the whole of the lamps for which provision could be made would be taken up, and that, at the proposed low charge of 4d. per unit, a profit of £941 would be earned. By this time, the Inspectors of the Board must be tired of hearing these hypothetical and fancy figures in connection with small electric lighting ventures.

Accounts presented to the Plymouth Town Council yesterday week show that the first six months' operation of the municipal electricity works has resulted in a loss of £1374. The undertaking is a combination of lighting and traction; but the accounts do not distinguish between the income for current supplied for the working of the tramways and that supplied for lighting, and do not separate the receipts from public and private lighting. The total revenue for the six months was £3278, of which £3122 was for current supplied. The working expenses were £3167; and the interest and sinking fund on loans account, and various establishment charges, amounted to £1485.

The Middleton Corporation are going in for an electric light scheme; and they have applied to the Local Government Board for power to borrow £20,000 for the purpose. An inquiry has been held into the matter by Mr. R. H. Bicknell. He was informed that 200 post-cards had been sent to people whom it was thought would use electricity; and most of them had stated their willingness to become consumers. The Inspector displayed an unpleasant curiosity as to what was meant by "most of them;" and then it appeared that seven hotels, 88 dwelling-houses and shops, a few works, one bank, and one livery stable comprised the total, which is a long way from the 200. There was a little opposition to the scheme.

Electric lighting at Heckmondwike bids fair to be an expensive matter for the ratepayers. Tenders for the works and buildings have been under the consideration of the District Council; and they amount to £14,842—being an increase of £1500 on the original estimate of Mr. Hawtayne. The advance is attributed to the higher prices of materials. The cost in sinking fund, at 3¾ per cent. for 25 years, is estimated at £853 per annum; and there is now a consensus of opinion in the Council that the scheme will involve an annual rate-in-aid of 3d. or 4d. in the pound for many years. Land and other property in connection with the scheme was acquired several months ago; but since then the electric lighting fever has abated to a very considerable extent.

At the Lincoln Guildhall last Thursday, Mr. F. H. Tulloch conducted an inquiry on behalf of the Local Government Board into the Corporation's application for power to borrow £6000 for the extension of electric lighting in the city. Mr. W. T. Page (Deputy Town Clerk) explained that a loan was sanctioned in 1897 for £20,650, and in 1899 there was another loan of £19,000 for extensions. Of the last-mentioned amount £4500 was still unexpended; and the loan now asked for was to provide and lay down cables in the southern part of the city, where there was every probability of the demand for the current increasing. Replying to the Inspector, Mr. Page said the capacity of the present plant was 18,000 8-candle lamps, and with the proposed extension the capacity would be 25,000 lamps. There was no opposition.

At the meeting last Tuesday of the Kingston Town Council, Alderman Collings moved that the Council authorize application to be made to the Local Government Board for their sanction to the borrowing of £15,000 for further extensions in regard to the electric light works. Referring to the annual report of the Borough Electrical Engineer (Mr. J. E. Edgcome), he pointed out the very satisfactory results of the past year's working. The gross profit before paying interest and the instalment of capital was £2737; but after paying the interest, there still remained a sum of £1298 applicable to the redemption of capital. As the amount required was £1346, there was an adverse balance of £48, as against an adverse balance of £1112 in 1898. This showed that the electric lighting was an enterprise which had become a decided financial success; and so small a deficiency as £48 led him to hope that next year there would be a balance in hand in relief of the rates. The motion was carried unanimously.

The governing bodies of small and moderate sized towns who are aspiring to become their own suppliers of electric lighting should pause and consider the woeful plight of Hanley, in connection with its electric lighting undertaking, as pictured in a recent issue of the "Staffordshire Sentinel." Our contemporary states that, at the last meeting of the Council, it was announced that £1200 would have to be included in the rates for the ensuing year; being the loss on the electric lighting concern. But "considerable sensation" has been caused by a statement published in a previous issue of the "Sentinel" that the actual loss on the undertaking during 1899 was £2269, and that this loss had apparently been continuing at the rate of over £40 per week. The actual revenue last year amounted to £8809, and the expenditure to £7632; leaving a balance of £1177, which was all that could be shown towards the interest and sinking fund, amounting to £3446. If things go on as they are doing at present, the total loss promises to stand at £4538 at the end of this year, which the confiding ratepayers will have the pleasure of making up in extra rates. This year they are providing £1200, which still leaves £1069 loss to be made good.

At the meeting of the Salford Town Council last Friday, a letter was read from Mr. C. L. Turner, the Borough Electrical Engineer, in answer to the resolution of the Council asking him to resign his position (*ante*, p. 1321). The letter stated: "I cannot admit any reason why I should resign. I know that the charges brought against me were without foundation, and I consider the evidence I produced to your Committee was sufficient to disprove them. If your Council think otherwise they must act accordingly. With the consciousness of my own *bona fides* and of my faithful service to the Corporation, I cannot adopt the course required of me, and admit what I strongly deny." The Mayor (Alderman Rudman) moved—"That, in view of the refusal of Mr. C. L. Turner to comply with the resolution of the Council of the 7th inst. requiring him to resign forthwith, the Council hereby determine his appointment, and instruct the Borough Treasurer to pay him three months' salary in lieu of notice." He said it was extremely painful that the action of the Electrical Engineer should have necessitated such a resolution. Mr. Turner had been ill-advised in the matter. Alderman Phillips seconded the motion, and it was carried with three dissentients.

The members of the Yeadon District Council evidently all belong to the leisured class to whom time is of little object. They have had several discussions on the electric lighting question; and they again applied themselves to its consideration last Tuesday for three-and-a-half hours. But even then no decision was arrived at; and another meeting is to be held next week. The meeting last Tuesday was chiefly interesting on account of the communications received from two sources as to the comparative cost of gas and electric lighting. Mr. A. H. Preece wrote that it was impossible to make a comparison until it was known at what price each illuminant was supplied; but it was usually taken that electricity at 6d. per unit was practically equivalent to gas at 3s. per 1000 cubic feet. It is too bad of the son to ignore the opinion of his eminent father, that eight units of electricity are about equivalent to 1000 cubic feet of gas. Then Messrs. Hopkinson and Tabot wrote that 15-candle power gas at 2s. 8½d. per 1000 feet (the net price at Yeadon) was about equivalent, so far as its illuminating power was concerned, to electricity at 4½d. per unit. It was not likely, they also said, that electricity supply could be made to pay at Yeadon unless there was a substantial demand for power for manufacturing purposes. Even the "doctors" of the electrical industry differ, and differ widely.

The Chesterfield Corporation obtained an Electric Lighting Order in 1894; but the purchase of the gas and water undertakings caused the question to be shelved. But the threatened intrusion of Companies has roused the Corporation to activity again; and they have settled on a scheme for which they require to borrow £25,000. Consequently, last Tuesday, Mr. F. H. Tulloch held an inquiry on behalf of the Local Government Board. Interesting evidence was given by the Chairman of the Electrical Committee (Mr. C. P. Robinson). He said that, by direction of the Board, the town had been canvassed; and the result had been remarkable. For the purpose of the canvass, the town had been divided into four divisions. The central portion had applied for 4912 lights, and 11 motors equivalent to 58-horse power. He had put 50 per cent. on the lights in order to bring them to the 8-candle power. Most of those supplied would be 16-candle. This brought the number of lights up to 7368 of 8-candle power. Reducing the motor power applied for to its lighting equivalent of 1160 lights, they had a total demand by the central, or business portion of the town for 8528 lights. The second district, comprising four streets, had applied for 1117 lights, and one motor—or 1680 8-candle lights. The third district applied for 628 8-candle lights; and the fourth district for 1407 lights. Then the Council had sanctioned 20 arc lamps for the public street lighting. The total demand was for 12,242 8-candle lights. The question had arisen in the town as to whether or not the adoption of electricity would injure the gas undertaking, which, as had been stated, was two-thirds the property of the town; but the evidence gathered from other towns where the experiment had been tried went to show that the gas undertaking would not be injured. In four years, the consumption of gas had increased by 75 per cent. The gas-works had already been enlarged; and if a further demand came upon them, the Engineer had advised them to put down a new holder of a million cubic feet capacity, at a cost of from £18,000 to £20,000. The Corporation had considered it best to spend money in electric lighting, instead of enlarging the gas-works.

The Corporation of Sudbury having applied to the Local Government Board for sanction to the borrowing of £13,150 for various purposes connected with the improvement of the town (including £650 for electrically lighting the Wents Estate), the matter was the subject of an inquiry by Major-General H. D. Crozier, R.E., at the Town Hall last Wednesday. Mr. W. C. C. Hawtayne, the Consulting Electrical Engineer to the Corporation, gave details of the scheme. He said the Wents Estate had an area of 15 acres; and the total expense of lighting it would be £650. The charge would be 2d. per unit, and there would be some twenty

60-watt incandescent lamps. About 1500 units a year would be the consumption. The cost of lighting would be £12 10s. per annum; but including repairs, interest, &c., the total expense to the Corporation would be about £47, until the estate was brought into the general scheme for the town, which would cost £16,300. Mr. F. Shewell Cooper, who represented the Gas Company, the Lessee (Mr. C. W. Grimwood), and several ratepayers, pointed out that the Company had offered to light the estate with 20 lamps for £35 a year—£1 each for lighting and 15s. for upkeep—supplying standards, paying all expenses of laying mains, and so forth. Witness remarked that this did not bear the same proportion to the other charges of the Company. The Borough Surveyor (Mr. Hayward) said that at present there were four gas-lamps on the estate. For the year 1899-1900 the cost of lighting the lamps of the town was £336, which, for 189 lamps, was about 35s. 6d. per lamp. Mr. Cooper contended that the proposal to expend £650 to light a small part (15 acres) of the town by electricity was ridiculous. Was it not more reasonable, he asked, to light the estate with gas, in the same way that the other portions were lighted? It was clear from the figures—cost of gas £35, and of electricity £47 10s. per annum—that by the adoption of the latter scheme a considerable burden would be thrown upon the ratepayers, without any corresponding advantage. He submitted that the provision of lamps such as those already in use would be ample. If they accepted the offer of the Gas Company, there would be no initial outlay on the part of the Corporation. As a separate scheme, the proposal was chimerical; but as part of a general scheme, there might be something to be said in favour of it. There had been no serious demand for electric lighting—no ratepayers' meeting in support of it, though possibly a few private persons might have applied for it; but the Corporation were trying to thrust the scheme upon the ratepayers, and he should ask the Inspector to report unfavourably upon it. The Town Clerk (Mr. W. B. Ransom), in reply, said the Council had been advised that electricity would be cheaper than gas; and although there would be extra expense during the first few years, the works would become the property of the Corporation. He therefore trusted that the Inspector would report favourably on the scheme.

Wilmslow and Alderley Edge Gas Company.—The annual meeting of this Company was held last Tuesday, at the offices, in Manchester. In their report, the Directors recommended a dividend of 10 per cent. on the old, and 7 per cent. on the new shares (less income-tax). The profits for the year ending March 31 amounted to £2400; and the balance, after payment of the dividends, is £251. The Directors regarded this as satisfactory, in view of the reduction of 3d. per 1000 cubic feet in the price of gas. During the period covered by the report, 45,202,300 cubic feet of gas were made, of which 43,530,700 cubic feet were sold. There was an increase of 50 in the number of consumers; the total on the books being now 959. The report was adopted; and votes of thanks were accorded to the Chairman (Mr. R. L. Bourne) and Directors, the Secretary (Mr. W. H. Welsh), and the Engineer and Manager (Mr. W. Severs).

WEST MIDDLESEX WATER-WORKS COMPANY.

The Half-Yearly General Meeting was held at the Company's Office, No. 19, Marylebone Road, on the 15th inst., under the presidency of Mr. Edmund Boulnois, M.P.

The Secretary (Mr. F. H. Wybroo) read the advertisement calling the meeting, and subsequently the report of the Company's Auditors, who stated that the total expenditure on works amounted on March 31 last to £1,759,003, including £53,534 expended during the past half year; the outlay being £15,341 in excess of the amount received. The gross rental for the half year to Ladyday last was £144,003, showing an increase on that of the corresponding period of 1899 of £3579. The balance to the credit of the dividend and interest account was £66,108.

The Chairman, in moving the adoption of the report and accounts, observed that the progress and prosperity of the Company continued. During the half year no fewer than 560 new supplies had been laid on. They were constantly getting an accession of new consumers in the districts that were being developed; and further outlay was, therefore, continually required to be made. The Engineer reported that all the works had been maintained in a thoroughly efficient condition; and it was one of the features of the Company that the Board had always endeavoured to keep the property at the highest point of efficiency. The Directors' report contained a paragraph alluding to the final report of the Royal Commission on London Water Supply, and he felt sure that the proprietors would agree with him that this report was highly satisfactory. The Commission were appointed in May, 1897; and the inquiry had been a most exhaustive and searching one. The legal acumen and ability of the Chairman, Lord Llandaff, was brought to bear on every point in a manner which was quite surprising. His Lordship made himself thorough master of the whole subject; and he (the speaker) did not believe that there was a single thing that could be examined, either for the case of the London County Council or for that of the Metropolitan Water Companies, which was left untried. Of course, the County Council left no device unemployed to damage the case of the Companies; but, as on many previous occasions, they were not successful in this. Indeed, the Commissioners stated explicitly that on the whole the Companies had performed their duties efficiently and to the public satisfaction; and he did not know that they could have any higher praise than this, because the public were somewhat exacting in their requirements from the Water Companies. Notwithstanding the unanimous report of the Royal Commission, that in their opinion the London County Council were not the body who ought to acquire the undertakings of the eight Companies, the County Council deliberately asked Parliament to affirm that they were the body to do this; and, in spite of advice which was given to them by the large minority of the Moderates on the Council, the majority courted defeat on the second reading of their Purchase Bill, which was thrown out by the considerable majority of 83. The Bill introduced by the County Council to expend over £18,000,000 in constructing reservoirs and works in Wales, and aqueducts, &c., for the supply of water to London was thereupon withdrawn. It had always surprised

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 1355.

Issue.	Share	When ex-Dividend.	Dividend or Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 11	10½	Alliance & Dublin 10 p. c.	20—21	..	5 0 0
100,000	10	,,	7½	Do. 7 p. c.	13¾—14½	..	5 3 5
800,000	100	Jan. 2	5	Australian 5 p. c. Deb.	102—104	..	4 16 2
230,000	5	May 16	6	Bombay, Ltd.	6—6¼*	..	4 12 4
40,000	5	,,	6	Do. New, £4 paid	4—4¼*	..	5 6 8
880,000	Stk.	Feb. 23	12	Brentford Consolidated	250—260	..	4 12 4
270,000	,,	,,	9	Do. New	185—190	−5	4 14 9
50,000	,,	,,	5	Do. 5 p. c. Pref.	140—145	..	3 9 0
159,375	,,	Dec. 14	4	Do. 4 p. c. Deb.	118—123	..	3 5 1
220,000	Stk.	Mar. 14	11½	Brighton & Hove Orig.	235—240	−2	4 15 10
226,320	,,	,,	8½	Do. A. Ord. Stk.	175—180	−2	4 14 5
999,500	Stk.	Feb. 23	5	Bristol, 5 p. c. max.	125—130	..	3 16 11
420,000	20	Mar. 29	10	British	39—41	..	4 17 7
50,000	10	Feb. 23	12	Bromley, Ord. 10 p. c.	24—26	..	4 12 4
79,000	10	,,	9	Do. 7 p. c.	19—21	..	4 5 8
500,000	10	May 16	6	Buenos Ayres (New) Ltd.	9—9¼*	..	6 6 4
220,000	Stk.	Dec. 29	4	Do. 4 p. c. Deb.	99—101	..	3 19 3
150,000	20	Mar. 14	8½	Cagliari, Ltd.	24—26	..	6 6 11
100,000	10	Sept. 29	8	Cape Town & Dis., Ltd.	14—15	..	5 6 8
50,000	50	May 2	6	Do. 6 p. c. 1st Mort.	55—57	..	5 5 3
550,000	Stk.	Apl. 11	13½	Commercial Old Stock	275—285	..	4 14 9
236,425	,,	,,	10½	Do. New do.	210—220	..	4 15 5
288,237	,,	Dec. 14	4½	Do. 4½ p. c. Deb.	141—144	−1	3 2 6
800,000	Stk.	Dec. 14	9	Continental Union, Ltd.	160—165	−2½	5 9 1
200,000	,,	,,	7	Do. 7 p. c. Pref.	175—180	..	3 17 9
51,600	Stk.	Feb. 23	14	Croydon A 10 p. c.	335—340	..	4 2 4
173,400	,,	,,	11	Do. B 7 p. c.	265—270	..	4 1 5
555,000	Stk.	Feb. 23	5½	Crystal Palace Ord. 5 p. c.	116—120	..	4 7 6
60,000	,,	,,	5	Do. 5 p. c. Pref.	130—135	..	3 14 1
486,090	10	Jan. 26	11	European, Ltd.	19—20	−⅛	5 10 0
854,060	10	,,	11	Do. £7 10s. paid	14—15	−⅛	5 10 0
14,993,075	Stk.	Feb. 9	4⅝	Gas-light and Coke	4 p. c. Ord.	95—98	−3½	5 0 0
2,600,000	,,	,,	3⅛		3½ p. c. max.	96—98	..	3 11 5
3,799,735	,,	,,	4		4 p. c. Con. Pref.	117—119	−1	3 7 3
3,993,975	,,	Dec. 14	3		3 p. c. Con. Deb.	97—99	..	3 0 7
70,000	10	Nov. 15	8	Hongkong & China, Ltd.		13½—14½	..	5 10 4
3,800,000	Stk.	May 16	10	Imperial Continental		202—205*	−1	4 17 7
473,600	Stk.	Feb. 9	3½	Do. 3½ p. c. Deb. Red.		100—103	..	3 8 0
75,000	5	Dec. 14	6	Malta & Medn., Ltd.		4¾—5¼	..	5 14 3
560,000	100	Apl. 2	5	Met. of Melbourne	5 p. c. Deb.	105—109	..	4 11 9
250,000	100	,,	4½		4½ p. c. Deb.	105—107	..	4 4 1
541,920	20	Nov. 15	3	Monte Video, Ltd.		10½—11½	..	5 4 4
667,946	Stk.	Feb. 23	9½	Newc'tle & Gatesh'd Con.		215—220	..	4 4 1
299,855	Stk.	Dec. 29	8½	Do. 8½ p. c. Deb.		104—107	..	3 5 5
150,000	5	May 16	8	Oriental, Ltd.		7—7⅛*	+⅛	5 6 8
135,000	5	,,	8	Do. New, £4 10s. pd.		6½—6⅝*	+⅛	5 6 8
15,000	5	,,	8	Do. do. 1879, £1 pd.		1¼—1⅜*	+⅛	4 11 5
				* Ex. div.			

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
60,000	5	Feb. 23	7	Ottoman, Ltd.	5—5½	..	6 7 3
500,000	100	Dec. 1	6	People's Gas of Chicago 2nd Mtg. Bonds	102—106	..	5 13 2
851,070	10	Apl. 27	7	River Plate Ord.	10½—10¾	−¼	6 10 3
250,000	Stk.	Dec. 29	4	Do. 4 p. c. Deb.	100—102	..	3 18 5
250,000	10	Apl. 11	8	San Paulo, Ltd.	11½—12½	..	6 8 0
135,000	Stk.	Mar. 14	10	Sheffield A.	245—247	..	4 1 0
209,053	,,	,,	10	Do. B.	244—246	..	4 1 4
447,427	,,	,,	10	Do. C.	244—246	..	4 1 4
5,600,000	Stk.	Feb. 23	5⅝	South Metrop., 4 p. c. Ord.	123—126	+1½	4 4 7
1,520,000	,,	Jan. 12	3	Do. 3 p. c. Deb.	98—100	−1	3 0 0
380,940	Stk.	May 16	5	Southampton Ord.	115—120*	..	4 3 4
70,825	,,	Dec. 29	4	Do. 4 p. c. Deb.	120—125	..	3 4 0
120,000	Stk.	Mar. 14	6	Tottenham and Edmonton A. 5 p. c. B. 3½ p. c. 4 p. c. Deb.	120—125	−17½	4 16 0
250,520	,,	,,	4½		95—100	−3½	4 10 0
55,100	,,	Dec. 14	4		113—117	..	3 8 5
182,380	10	Jan. 12	5	Tuscan, Ltd.	7—8	..	6 5 0
149,900	10	Jan. 2	5	Do. 5 p. c. Deb. Red.	101—104	..	4 18 2
				WATER COMPANIES.			
780,399	Stk.	Dec. 29	11	Chelsea, Ord.	305—310	..	3 11 0
150,000	,,	,,	5	Do. 5 p. c. Pref.	157—162	..	3 1 9
160,000	,,	,,	4½	Do. 4½ p. c. Pref. '75	145—150	..	3 0 0
175,785	,,	Mar. 29	4½	Do. 4½ p. c. Deb.	145—150	..	3 0 0
1,720,560	Stk.	Apl. 11	7	East London, Ord.	190—195	−3	3 11 10
654,740	,,	Dec. 29	4½	Do. 4½ p. c. Deb.	145—150	..	3 0 0
890,000	,,	,,	3	Do. 3 p. c. Deb.	99—101	..	2 19 5
700,000	50	Dec. 14	7½	Grand Junction 10 p. c. max. 4 p. c. Deb.	103—106	−½	3 10 9
810,000	Stk.	Mar. 29	4		130—135	..	2 19 3
708,000	Stk.	Feb. 23	14	Kent	307—312	..	4 9 9
160,000	,,	,,	7	Do. New, 7 p. c. max.	200—210	..	3 6 8
1,043,800	100	Dec. 29	10½	Lambeth, 10 p. c. max.	290—295	−2	3 11 2
406,200	100	,,	8	Do. 7½ p. c. max.	207—212	−1	3 15 6
350,000	Stk.	Mar. 29	4	Do. 4 p. c. Deb.	130—133	..	3 0 2
500,000	100	Feb. 23	13½	New River, New Shares	415—420	−2	3 4 3
1,000,000	Stk.	Jan. 26	4	Do. 4 p. c. Deb.	132—137	..	2 18 5
902,300	Stk.	Dec. 14	7½	South-wark and Vauxhall 7½ p. c. max. 5 p. c. Pref. 4 p. c. A Deb.	195—200	−3	3 15 0
126,500	100	,,	7½		185—190	−2	3 18 11
489,200	Stk.	,,	5		160—165	..	3 0 7
1,019,585	,,	Apl. 11	4		129—134	..	2 19 9
1,155,066	Stk.	Dec. 14	10	West Middlesex	283—288	−2	3 9 5
200,000	,,	,,	4½	Do. 4½ p. c. Deb.	147—152	..	2 19 3
200,000	,,	Mar. 14	8	Do. 8 p. c. Deb.	99—101	..	2 19 5
				*Ex div.			

him that the County Council should have kept the Bill on the notice paper of the House of Commons—the Royal Commission having stated so explicitly that there was no necessity whatever for the public money to be wasted in going to Wales for water. He should like to say with confidence on this that there was no probability that the County Council would renew their attacks on the Water Companies in the immediate future. But having been a member of that body himself for over eleven years, he had naturally somewhat gauged their character; and he might tell the proprietors—what, indeed, they had probably already learned for themselves—that the London County Council were a body who never knew when they were beaten. He should therefore not be the least surprised if by-and-bye, for next session, plausible reasons were not forthcoming which would induce the Progressive majority of the County Council to dip a little deeper into the pockets of the unfortunate ratepayers, and incur a further useless expenditure in promoting a Bill or Bills against the Water Companies. For his own part, however, he sincerely hoped that this would not be the case. Hardly a session had passed since the County Council were established in which the Water Companies had not had to defend themselves against the attacks of that body; and in the case of this Company, the fact was peculiarly hard upon their consumers, because the County Council not only paid out of the rates the expenses of promoting their Bills, and of their attempts to defeat the Bills of this Company, but the latter were compelled to defend themselves in these attacks and to promote Bills for the advantage of their consumers—he would not say out of the rates, but practically out of the same thing, because the money must come out of the pockets of the consumers in the rebate which the Company allowed them. The joint Bill introduced this session on behalf of a majority of the Metropolitan Water Companies was withdrawn after a pronouncement by the Speaker of the House of Commons that the measure was one which, in his judgment, was not suitable for promotion as a Private Bill, as it conferred large powers upon a State Department, and so should be introduced as a Public Bill. The rebate of 10 per cent. from the statutory water-rates, amounting now to about £28,000 per annum, had been continued to be made to all the consumers in the Company's district. It was impossible to say how long this very handsome discount could be continued. Parliament had imposed such very heavy burdens upon the Company that it was clear that the consumer would ultimately be deprived—although he could not say how soon—of the advantages which he reaped from the careful management and conduct of the Company's affairs. The payments to the City Chamberlain, which were ordered by Parliament to be made under circumstances which he thought he might safely say no longer existed, had already begun to be made by this Company. He might point out, incidentally, that the accounts which had been presented to the proprietors on this occasion were signed only by the Company's Auditors—the name of the Official Auditor not appearing. The latter had not signed the accounts because a difference of opinion had arisen between the Secretary and Mr. Stoneham with reference to the amount which the Company were compelled to pay under their Act of 1894 to the City Chamberlain. The Directors had very carefully considered this question; and they unanimously supported the view held by the Secretary as to the amount which the Company were compelled to pay this half year. The question was complicated to some extent by the Company's connection with the Staines Reservoirs Joint Committee; but the whole matter would be settled by arbitration, which was the course prescribed by Parliament in these matters. Their Company and the other Companies were also affected by certain other small questions in connection with which arbitration would be resorted to in the usual way; but he might tell the proprietors that whatever was happening between the Company and the Official Auditor could not in any way endanger their dividend. The Board greatly regretted to announce the death of their old and esteemed colleague, Mr. W. P. Bodkin, who took an active interest in all the affairs of the Company, and who laboured among them to the last. He could not conclude without again expressing the satisfaction of the Board at the manner in which the whole staff of the Company, from the Secretary and the Engineer downwards, had discharged their duties.

The Deputy Chairman (Mr. Jackson Hunt) seconded the resolution.

Mr. Werry asked whether it was possible, considering the large reserve fund the Company had, that the dividend could not be paid without deducting income-tax.

The Chairman, in reply, said he feared that it would not be legal to pay the dividend free of income-tax, as in that case the distribution would be more than 10 per cent.

The motion was carried unanimously.

Resolutions were afterwards passed declaring a dividend for the half year ended March 31 at the rate of 10 per cent. per annum, payable, less income-tax, on and after July 5 next, and re-electing the retiring Directors and Auditors.

The meeting was afterwards made special, when, on the motion of Mr. F. E. Bodkin, seconded by Mr. Howson, the Hon. Charles, Baron Dimsdale was appointed a Director of the Company, to fill the vacancy caused by the death of Mr. W. P. Bodkin.

The usual complimentary votes terminated the proceedings.

HARWICH WATER SUPPLY.

At the recent Quarterly Meeting of the Harwich Town Council, the Public Health Committee reported, with reference to the defective supply of water to which the attention of the Corporation was drawn at the previous meeting, that the opinion of Counsel (Mr. Tindal Atkinson) had been taken, and as his advice entirely coincided with that given by the Town Clerk, the Committee recommended—"That proceedings be at once instituted by the Corporation against the Tendring Hundred Water-Works Company for a mandamus to compel them to obtain and provide for the Borough of Harwich a sufficient and permanent supply of pure and wholesome fresh water, constantly laid under pressure, in accordance with the provisions of the Tendring Hundred Water-Works Act, 1884 and 1886, and of the Order of the Local Government Board, dated the 28th of July, 1892." The Town Clerk having read the communication received from Mr. Tindal Atkinson, Alderman

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SULPHATE OF AMMONIA PLANTS.

Nalborough, in strong terms, moved that the mandamus be applied for. He said that it was quite time the Council spoke in very plain terms to the Company about the supply, as for years past the ratepayers had been greatly inconvenienced. When the question of the insufficient water supply was first brought to the notice of the Company, they replied that a constant supply would be given, as they were erecting a new reservoir at Dovercourt. This had been done, but the reservoir proved unsatisfactory. He further moved—"That an injunction be applied for against the Water Company, to prevent them from supplying water to any person or persons in such a manner as to prejudice the giving of a proper and sufficient supply for domestic purposes within the limits of the above-mentioned Acts, and contrary to the provisions thereof." Both propositions were carried *nem. con.*

THE TEES VALLEY WATER BOARD.

The half-yearly report of the Tees Valley Water Board to the Corporations of Stockton, Middlesbrough, and Thornaby was considered at the meeting of the Board on Monday last week. It showed that the capital expenditure for the half year had been £15,418; bringing up the total cost of the undertaking to £1,895,555. The sum of £24,391 was received on capital account during the half year; the total to date being £1,889,194, or £6360 less than the amount expended. But a precept was issued (payable on March 13) for £11,887 on account of mains extensions. The revenue account showed an income of £46,248; being an increase of £3222 as compared with the preceding half year. The expenditure on revenue account was £8362; being an increase of £246. The balance carried to net revenue account was £37,887, as against £34,909. The net revenue account was debited with several payments for interest, and was credited with the interest allowed by the bank. After being dealt with in this manner, there remained a balance of £71,988, including £34,502 brought forward from the previous half year. Of this amount £53,800 was paid to the Corporations during the half year; leaving £18,188, of which £18,000 has since been paid to the Corporations. The report was approved.

New Joint-Stock Companies.—The Compressed Fuel Syndicate, Limited, with a capital of £15,000, in £1 shares, will acquire any inventions relating to the manufacture of artificial fuel and machinery used in connection therewith, and carry on the business of engineers, coke and fuel manufacturers, colliery proprietors, coal merchants, &c. The Ingleton Water Power Company, Limited, with a capital of £7000, in £1 shares, has been formed to acquire the business carried on by the Ingleton Carbide Company at Ingleton Mill, Yorkshire, and to carry on the business of calcium carbide manufacturers and merchants. The Cookstown Gas and Light Company has been registered with a capital of £10,000, in £1 shares, to acquire and carry on the business of the Cookstown Gas Company.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

With the fixing of the gas coal contracts for Glasgow and Paisley, the purchases of coal for the coming year are practically over; and the worst is now known. A rise of 50 per cent. in one year, is an experience not to be sought, and one which, when it comes unsought, as now, is not likely to be forgotten. The gas manager who is able to escape a rise of at least 3d. per 1000 cubic feet in the price of gas, will be fortunate. The Glasgow contract is for about 500,000 tons; and the tenders accepted are for quantities of from 10,000 up to 40,000 tons. First-class cannel was tendered for at such a prohibitive price that very little of it has been purchased. It is explained that, on account of the price of oil, consequent upon Russian dealing, having risen by about 100 per cent., the demand for cannel for enriching purposes has become stronger than it has been for years. Second-class cannels are suitable for the manufacture of gas in Glasgow; and these have been bought largely, from Lanarkshire and Ayrshire coalmasters, at an increased price of from 5s. to 7s. 6d. per ton. Splint has also been purchased heavily, at from 14s. 6d. to 15s. a ton—the bulk at 14s. 9d.—which is fully 5s. advance upon the current year's prices. The balance is made up of shale—from Fifeshire chiefly—which is also up from 4s. to 5s. per ton. Last year the prices were advanced about 1s. per ton. The Corporation are evidently pleased with their oil process, because they are about to extend it by the erection of six additional cast-iron retorts at Dawsholm, the contract for which has been let to Messrs. R. Laidlaw and Son. With the two processes of coal and oil at command, there is a better chance of good results being obtained than where there is only one.

The Paisley Corporation contracts are for about 27,000 tons of coal, which is about 10,000 tons less than the current year's contracts. The price for splints is up about 5s., and shales about 4s. 6d. per ton.

The plans for the new Provan gas works for the Corporation of Glasgow were before the Town Council on Thursday. Mr. R. M. Mitchell, the Convener of the Gas Committee, said that the plans had been before the Committee and had been unanimously approved. The section which it was proposed to construct at present was about one-fourth of the works when completed; and it would have a producing power of 12 million cubic feet per day. The ground was very well suited for the erection of a gas-works—in fact, better ground for the purpose could not be found in the neighbourhood of Glasgow. Everything in connection with the works would be constructed in the most modern way, and with a view of obtaining a maximum production of gas per area of ground at a minimum cost for labour as compared with any other system of carbonizing in practical use. Ample provision was being made for the utilization of residual products, which formed a very large part of their production. They could either use the works themselves or let them out to other people, under such arrangement as might be thought best. Another important matter in connection with the manufacture of gas was the fact that the highest qualities of cannel coal were becoming very scarce in Scotland, and Mr. Foulis had provided in the erection of the works for

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the production of oil gas. It was proposed to erect two gasholders. These would store considerably more than the works would yield for some time at least. But with the present rate of increase in the annual demand for gas, notwithstanding the progress that had been made, it would only be a very short time before the whole of the storage capacity would be required; and in order to have a constant supply of gas, Mr. Foulis thought it better that the two holders should be proceeded with at once. The cost of the section of the works which it was proposed to go on with at present would probably be something like £300,000. This did not mean that the cost of the four sections would be four times that amount, because in connection with the first section there was the cost of levelling and preparing the ground, which to a large extent might reduce the outlay on the other sections. The works might cost upwards of a million pounds, and they would give ample security for a long time to come that the citizens of Glasgow would be able to count on a certain supply of gas. The minute was approved.

The Council then considered a report by Mr. Foulis upon the subject of the alleged capricious dismissal of men who had been employed in one of the gas-works, and which the Gas Committee had adopted by a majority of 12 to 5. Mr. Foulis's report was to the effect that during the past six weeks nearly 400 men had been discharged from the works, for the reason that there was no work for them, and several more had still to be paid off. No men had been taken on for several months. The men are taken on and discharged by the Works Manager. After full investigation, he was satisfied that there had been no undue preference shown towards any particular workman, and that no workman had been discharged because he was or was not a member of any Union. The submission of this report gave rise to a long discussion, nearly all of which was on the one side—that of the men. The occasion was probably seized upon as appropriate for "making the Council Chamber ring" with the cause of the men, until the Town Council agree to recognize the men's Union. The motion on behalf of the men was that the report be taken back by the Committee and reconsidered; the suggestion being thrown out that a Sub-Committee might be appointed to meet with the men. Apparently very little recognition would satisfy them—that is, until they may chance to get that little, and then Glasgow would be added to the list of towns where recognition had been accorded, and the fact would be well rubbed in upon other less acquiescent corporations. The Corporation will commit a mistake if they give up their right to manage the works in their own way. If there be any truth in the remark of Bailie Willoch, to the effect that "the men had been influenced in what they had done by a man who stood behind a public-house counter," it was sufficiently startling to make everyone pause and reflect. What sort of balance-sheet could be expected if the employees in a municipal gas-works were to take their orders from a publican? I mean the corporation balance-sheet; the publican's would be all right. There was only one other item of consequence in the discussion. It was elicited that a change in the treatment of the men had been introduced since the Union started business in Glasgow. Till then, it had been the custom of the Works Managers to select the men who were to be retained, when the summer season arrived. But great offence was given by the system; and now the men working at a particular bench are dismissed *en bloc*, irrespective of every consideration. In the working of this method, it turned out that three men out of the 400 or so who were dismissed chose to say that they had been aggrieved; and the present agitation was entirely on account of the dismissal of these three men. Whichever way the Corporation may act, the Union will be able to manufacture a grievance out of it, which is a sufficient reason why the Union should be discouraged by all legitimate means. In the end, the Council were half persuaded that reconsideration was advisable; this course having been resolved upon by the casting vote of the Chairman (Bailie Fife). Now, as to this, the only reconsideration which will be acceptable to the men will be reinstatement; and if three men are to be reinstated because of length of service, it would soon be impossible to dismiss any men in summer. That is the goal to which the Corporation are travelling, if they give way in this matter.

A communication has been received from the Parliamentary Agent for the city of Perth, to the effect that, instead of granting borrowing powers to the Corporation to the amount of £100,000, whereof one-half was to be for electric lighting purposes, and the other half to defray the cost of the new gas-works, the Secretary for Scotland had decided to allow only £25,000 for the gas-works, and this, too, upon condition that £1000 be placed annually to a sinking fund for paying off the loan, and that £1000 be set aside annually for the paying off of annuities. The Gas Commissioners met this week to consider the communication. They were of opinion that the annuities should be redeemed out of the sinking fund, and directed that the sanction of the Secretary for Scotland should be asked to this arrangement. Misfortune seems to dog the footsteps of the Commissioners. How are they to proceed with the erection of new gas-works if they have not the capital?

The Dunfermline Gas Commissioners, on Monday, agreed to defer consideration of the report by Mr. H. Pooley, their Engineer, upon proposed additions to the carbonizing plant until June, when they will have before them the estimates of revenue and expenditure for the year. Upon the recommendation of Mr. Pooley, the Commissioners contracted for 9000 tons of coal at an average cost of 15s. 3·6d. per ton—an increase of 4s. 0·69d. per ton upon the price which is being paid under last year's contracts. A communication was received from nine Trades Unions, containing a resolution to the effect that the employment of one of the retort-men to do slater and other work outside of his working day of eight hours was an irregularity, and was prejudicial to the interests of other workmen. Mr. Pooley reported that the man was still being employed to do slater work, but not outside his working hours. This explanation seemed to satisfy the majority of the members; and the matter was allowed to drop. It was a trifling subject, and, at the same time, an impertinent one.

The Gas Committee of the Peterhead Town Council reported this week that the offers for coal showed an increase of 4s. 4d. per ton over those of last year. The Manager (Mr. George Keiller, junr.) was instructed to accept the offers. It was resolved to renew gas loans to the amount of £5000, at 3½ per cent.; and authority was given to negotiate a loan to meet the cost of extensions at the gas-works which are now in progress.

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CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 19.

Sulphate of Ammonia.—The week opened with a quiet, though steady, market. But later a firmer tone supervened; and, at the close, an advance upon the lowest points touched was realized—the quotations being £11 5s. to £11 7s. 6d. per ton, delivered f.o.b. at the ports. For some time the Continent has been very quiet. But considerable Colonial and Spanish orders have somewhat reduced the limited supplies; and both consumers and middlemen having begun to realize the situation, a much better inquiry has set in. In the forward position, there has also been more interest; and business is reported to have been done in Scotland at £11 7s. 6d. But the firmness of makers generally has rather discouraged buying. At the close, Beckton is quoted £11 10s. per ton.

Nitrate of Soda remains quiet at 8s. 4½d. per cwt. for ordinary, and 8s. 7½d. for fine quality.

LONDON, *May* 19.

Tar Products.—Lower prices are being taken for creosote and other tar oils; the season so far having been against consumption and in other respects disappointing. Pitch continues fairly steady; but the much higher freights now being asked have undoubtedly affected its value, and checked a possible advance. Benzols are steadier with more business being done, though the reported increased output does not tend to any important improvement in prices. Solvent and other naphthas are in slightly better demand. Carbolic acid is strong with much inquiry for forward delivery. Anthracene is steadier, with considerable business doing.

Prices are as follows: Tar, 17s. 6d. to 27s. 6d. Pitch, east coast, 38s.; west coast, 35s. Benzol, 90's, 6d.; special qualities for gas, 8d.; 50's, 8¼d. Toluol, 90's, 1s. 1d. Solvent naphtha, 1s. 1d. Crude naphtha, 3¼d. Heavy naphtha, 1s. Creosote, 2¼d. Heavy oils, 3¼d. Carbolic acid, 50's, 2s. 6d.; 60's, 3s. Naphthalene, 55s. to 75s. Anthracene, "A," 4d.; "B," 3d.

Sulphate of Ammonia.—The week has witnessed a distinct improvement in this market; and it looks very much as if dealers have had important orders up their sleeves. Urgent buying is going on; and the outlook is stronger. The average price may be taken as £11 5s. to £11 10s. per ton, less 3½ per cent., according to port of shipment.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Now that the important locomotive fuel contracts of the London and North-Western Railway Company in this district have been definitely concluded on the basis of a 5s. per ton advance on last year's rates, representing 13s. per ton at the pit mouth, this may be taken to settle the position generally, both as regards the railway and the gas companies. So far as gas coals are concerned, there has been no difficulty in obtaining contracts for next year's supplies at an advance of quite 5s. over 1899 prices; the general basis on which business has so far been done being about 13s. 6d. to 14s. per ton for the medium sorts of gas coal—such as Wigan four-feet—and 14s. 6d. up to 15s. for the best screened Wigan Arley gas coals. A fair number of contracts have already been put through at something like these figures; and there seems now to be no question whatever that these will represent the minimum prices, at any rate, for the ensuing season's supplies. As to the general trade of the district, perhaps the position in some directions is not quite so strong. For house-fire requirements, the demand is naturally falling off as the season advances; but it is still exceptionally good for the time of the year, and no stocks of any weight are as yet being put down. At many of the leading collieries the output continues short to meet the full requirements of their customers. All the present output of common round coal moves off freely for steam and forge purposes, and readily fetches recent full prices. At the pit, quotations range from about 12s. 6d. up to 13s. 6d. per ton for the lower qualities of round coal to 14s. 6d. and 15s. 6d. for the best descriptions. Although at most of the Lancashire collieries the output of slack is still insufficient to meet the demand, more plentiful supplies have been coming in during the last two or three weeks from the Midlands; the strike in the Potteries throwing a good deal of Staffordshire slack on the market, which has met with a ready sale here—especially as surplus lots have in many cases been offered at quite 1s. per ton below Lancashire prices. This has tended to ease the position somewhat; and although Lancashire collieries have not given way at all in their quotations, the competition from other quarters has temporarily a weakening effect on the market. For Lancashire slack, prices remain at from 10s. 6d. per ton for common to 11s. 6d. for best descriptions at the pit. The shipping demand is not more than moderate; and the minimum Association basis price has been reduced to 15s. 3d. for steam coals, delivered at the ports on the Mersey. For coke, the demand continues quite as strong as ever; and on forward contracts makers in some cases are getting advances on current rates. At the ovens, ordinary furnace cokes are quoted at about 24s. to 24s. 6d., and best foundry cokes up to 32s. per ton.

Northern Coal Trade.—The trade is very active, and there is an increased demand for coal; but the want of ready steamships is lessening the shipments for the time, and causing some irregularity, both in price and in the extent of the inquiry. Best Northumbrian steam coals are quieter at from 18s. 9d. to 19s. per ton f.o.b. Steam smalls are about 13s. to 13s. 3d. per ton, and are still very scarce; but it may be noted that much of the latter kind of coal is being delivered on contracts that average about 7s. per ton. In the gas coal trade, the production is still full, and is readily taken up. Though the local consumption is naturally less, the export season to the Baltic makes up in part for the deficiency. Some slight sales of gas coal are noticed at about 17s. per ton f.o.b.; but the bulk of the deliveries are on contracts at lower rates—about 16s. per ton f.o.b. being the average price of the best of these, while a few contracts run on at moderate prices for three or four months yet. Manufacturing coals are steady, and in good demand. Coke is very firm both

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for export and for home use. For the latter, about 29s. per ton free at the blast furnaces is the quotation. There is no change to report in the price of gas coke this week. Deliveries are at 16s. per ton, or thereabouts, on the average; but the output is limited, and with dearer coals it is expected we shall soon hear of higher prices for gas coke.

Scotch Coal Trade.—Prices remain high. This season there has been a recovery, to a very considerable extent, of the foreign contracts which were lost several years ago, on account of the strike of the miners. This circumstance will have the effect of making coal scarce on the market, and will thus help to keep up rates. Any hope there may be of prices coming down, may arise from the fact that nearly all the great coal contracts have now been entered into, and consequently there will be less inquiry. The prices quoted are: Main 14s. to 14s. 3d. per ton f.o.b. Glasgow, ell 15s. 6d. to 16s. 8d., and splints 15s. to 15s. 6d. The shipments for the week amounted to 234,423 tons—an increase of 17,471 tons upon the preceding week, and of 33,188 tons upon the corresponding week of last year. For the year to date, the total shipments have been 3,653,516 tons—an increase of 800,316 tons upon the same period of last year.

Tiverton Gas Supply.—The accounts of the gas undertaking for the year ended the 31st of March were presented to the Tiverton Town Council yesterday week. They show that the total receipts were £7960, and that the expenditure was £6226; leaving a balance of £1734. As interest and sinking fund absorbed £1478, there was a balance of £256 to be carried to the reserve. Alderman Thorne, Chairman of the Gas Committee, said the accounts were satisfactory; but, owing to the rise in the price of coal, they could not expect so good a result next year.

The St. Mary Church Gas Undertaking.—Terms have been agreed upon for the amalgamation of the district of St. Mary Church with the borough of Torquay. Among the assets to be taken over by the Corporation are the gas-works of the St. Mary Church District Council; but the Provisional Order provides that this and other properties are to be held "in respect exclusively of the added part of St. Mary Church." The works are to be held in trust by the Corporation for St. Mary Church, and any balance of revenue is to be applied "in relief of the rates levied in such area," while any deficiency is to be made good by the ratepayers of that district.

Messrs. Richmond and Co.'s Profit-Sharing Scheme.—The third annual distribution of profits to the employees at the Warrington branch of Messrs. Richmond and Co., Limited, took place last Saturday. Mr. E. W. T. Richmond, the Chairman and Managing-Director of the Company, to whose exertions the men owe the introduction of the scheme, presented the share certificates and interest. This is the first time that the whole of the bonuses have been distributed in shares. Employees who have participated in the two previous distributions have now a substantial amount invested in the 6 per cent. preference shares of the Company. Nearly 450 men took part in the distribution; and the bonuses amounted to upwards of £1500.

Increase in Price at Bradford.—The Bradford Corporation last Wednesday resolved to increase the price of gas from 2s. 3d. to 2s. 6d. per 1000 cubic feet.

The Water Scheme of Shrewsbury.—The everlasting question of an auxiliary water supply for Shrewsbury appears as far from settlement now as it was at the beginning; and it is a pity the Corporation do not take the matter boldly in hand, and adopt a comprehensive scheme that will satisfy the requirements of the Local Government Board. Their last proposal is that, instead of providing an entirely new supply, the present dual supply from springs near the town and the river should be improved. The Local Government Board have declined to sanction this, and recommend the adoption of the Batchcott scheme, the cost of which the Council consider prohibitive.

South African Lighting Association, Limited.—The report of this Company for the past year states that the unsettled state of affairs in South Africa during 1899, and the war now being carried on, have disturbed the course of business, and have had a prejudicial effect on the undertaking. The consumption of gas at Port Elizabeth for the entire year shows a small increase; but at Grahamstown, where the effect of the war has been more marked, there has been a slight decrease. In July last, a further reduction in the charge for gas at Port Elizabeth came into effect; and the increase in the price of gas coal has, in addition, militated against the year's working. The profits amount to £9208, or £855 less than in 1898. The available balance, including the amount brought forward, and after payment of debenture interest and income-tax, is £11,708. The Directors have transferred £1500 to the reserve account; and they recommend a dividend of 10 per cent., free of tax (less the interim dividend of 4 per cent. already paid). The sum of £1000 is added to the plant depreciation account, and the balance of £3958 is carried forward.

Monte Video Gas Company, Limited.—In the report which the Directors of this Company will present to the shareholders at the ordinary general meeting next Tuesday, they state the profit on the working of the past year, as shown by the revenue account, is £21,945, which has been passed to the credit of the profit and loss. Adding interest and discount (£1029) and profit on exchange (£132), the total is £23,106. After providing for interest on debentures, bad and doubtful debts, and for depreciation, the balance available for distribution is £19,154. An interim dividend was paid on Nov. 25 last, in respect of the half year ended the 30th of June, of 6s. per share, less income-tax, and the Board recommend the payment on the 1st prox., of a further amount of 8s. per share; making 3½ per cent. for the year. This will absorb £18,967, and leave a balance of £187 to be carried forward. The Company's operations throughout the year were carried on under more settled conditions than have prevailed in Monte Video of late years—there having been no important political disturbance; and the position of the Company has improved as follows: The number of meters in use increased by 10·15 per cent.; of consumers, by 13·93 per cent.; the sales of gas, by 4·50 per cent.; and the net profit by £2602.

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, M.E., Manager.
L. L. MERRIFIELD, M.Inst.M.E., Engineer.

London Offices: 19, ABINGDON STREET, WESTMINSTER, S.W.
American Offices: TORONTO. TELEGRAPHIC ADDRESS: "CARBURETED, LONDON."

CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cubic Feet Daily.
BLACKBURN	1,250,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000
SALTLEY WORKS, BIRMINGHAM	2,000,000
COLCHESTER	300,000
BIRKENHEAD	2,250,000
SWINDON (New Swindon Gas Co.)	120,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000
WINDSOR ST., BIRMINGHAM (Second Cont.)	2,000,000
HALIFAX	1,000,000
TORONTO	250,000
OTTAWA	250,000
LINDSAY (Remodelled)	125,000
MONTREAL	500,000
TORONTO (Second Contract; Remodelled)	2,000,000
BELLEVILLE	250,000
OTTAWA (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000
ST. CATHERINES (Remodelled)	250,000
KINGSTON, PA.	125,000
PETERBOROUGH, ONT.	250,000
WILKESBARRE, PA.	750,000
ST. CATHERINES (Second Contract)	250,000

	Cubic Feet Daily.
BUFFALO, N.Y.	2,000,000
WINNIPEG, MAN.	500,000
COLCHESTER (Second Contract)	300,000
YORK	750,000
ROCHESTER	500,000
KINGSTON, ONT.,	300,000
CRYSTAL PALACE DISTRICT	2,000,000
DULUTH, MINN.	300,000
CATERHAM	150,000
LEICESTER	2,000,000
ENSCHEDE (HOLLAND)	150,000
BUENOS AYRES (RIVER PLATE CO.)	700,000
BURNLEY	1,500,000
KINGSTON-ON-THAMES	1,750,000
ACCRINGTON	500,000
TONBRIDGE	300,000
STRETFORD	500,000
OLDBURY	300,000
TODMORDEN	500,000
SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
YORK (Second Contract)	750,000

Sales of Shares.—Last week, Messrs. Herbert Morris and Son sold by auction 600 new ordinary £10 shares, part of the additional capital of the Newhaven and Seaford Water Company. They were put up in £100 lots; and 40 were disposed of—39 at par, and the remaining one at 10s. premium. Mr. W. E. R. Randall also held, at Chatham, a sale of shares in the Brompton, Chatham, &c., Water Company. Some original "A" shares in the Company, yielding 10 per cent. dividend, fetched £14 12s. per share, while a few "B" shares, producing 7 per cent., were disposed of at £10 per share.

The Torquay Watershed.—Some controversy is taking place at Torquay with regard to the ultimate use of the land in the vicinity of the reservoirs which the Corporation have purchased during the past few years. Altogether, the estate consisted of 583 acres of moorland, 801 acres of arable land, 761 acres of pasture, and 74 acres of wood. At present there are only 231 acres of arable land, and this will be gradually converted into pasture. Last week, 850 acres were let for grazing at an average of 11s. per acre, or 1s. per acre less than was realized last year. The lower price is regarded as an indication of deterioration in the average value of the land; and it is assumed that it will continue to decline until it becomes moorland. As this would mean considerable falling off in revenue, the Corporation are being urged not to allow the land to go entirely out of cultivation. A belt of from 100 to 200 feet wide round the reservoirs is fenced off and uncultivated; and it is contended that the remainder may be safely dealt with by methods which will bring a larger return to the borough treasury. On the other hand, it has to be recognized that the only reason the Corporation had for purchasing the land was to ensure the water against risk of contamination from houses on the water-shed or the manuring of the ground.

The York United Gas Company have placed an order with Messrs. R. Dempster and Sons, of Elland, for four 25-feet square purifiers.

The Spalding District Council have granted a licence to the Vicar of Surfleet for the storage of carbide of calcium for the production of acetylene gas, with which the Parish Church is now lighted.

Exhibitions of gas appliances have lately been held by the following firms: Messrs. Fletcher, Russell, and Co., at Wallingford; Messrs. R. & A. Main, at Bristol; and Messrs. Wilsons and Mathiesons, at Chester. Lectures and demonstrations for the various firms were given by Mrs. Collins, Mrs. Pilcher, and Miss Wilkinson.

As will be seen by an announcement which appears elsewhere, the East London Water-Works Company are inviting tenders for an issue of £198,788 of 3 per cent. debenture stock; being the balance of the capital created under the Company's statutory powers. The stock will be redeemable at par after the expiration of 25 years from the date of issue, subject to six months' notice being given by the Company.

At the Mart, Tokenhouse Yard, to-morrow, Mr. Alfred Richards will conduct an important sale of gas and water stocks and shares, comprising new issues by order of the Directors of the Plymouth and Maidstone Gas Companies, and property placed upon the market by order of the Executors of the late Mr. W. H. H. Broadberry and others. The Companies concerned, in addition to those named above, are the Barnet, Buntingford, Colney Hatch, Harrow and Stanmore, Horley, Romford, St. Margaret's, Southend, Tottenham and Edmonton, Waltham Abbey and Cheshunt, Walton-on-Thames and Weybridge, West Surrey, and Woking. On the same occasion, he will offer for sale a few fully-paid £10 shares in the South African Lighting Association, Limited.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.

JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON BUILDINGS,
OLD BROAD STREET,
LONDON, E.C.

ANDREW STEPHENSON, AGENT. All communications re Oxide to the Company as above.

WINKELMANN'S

"VOLCANIC" FIRE CEMENT.

Resists 4500° Fahr. Best for use in GAS-WORKS.

ANDREW STEPHENSON,
182, Palmerston Buildings,
Old Broad Street,
"Volcanism, London." London, E.C.

PATENTS FOR INVENTIONS.

Messrs. J. C. CHAPMAN & CO., Chartered Patent Agents, ADVISE ON ALL MATTERS CONNECTED WITH ABOVE.

Information and Handbook on application,
70, CHANCERY LANE, LONDON, W.C.

BROTHERTON & CO.

Offices: Commercial Buildings, LEEDS. Correspondence invited.

HYDRATED OXIDE OF IRON.

PREPARED from Pure Iron.

Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.

READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

AMMONIACAL LIQUOR wanted.

BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

TO GAS AND WATER OFFICIALS.

HIGH-CLASS Cycles at reasonable and low Prices. Guaranteed for Twelve Months. Sent on approval. For Cash or Gradual Payment System. Send for Catalogue, Post Free.

MELROSE CYCLE COMPANY, COVENTRY.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

PRACTICAL RETORT SETTERS.

GEORGE NUTTALL & CO., 32, Havelock Road, Saltley, Birmingham.

Regenerator or other Furnaces erected to Engineers' own Designs. Best Work Guaranteed. Please write for Estimates.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM; and 45 & 47, Westminster Bridge Road, LONDON, S.E.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Addresses:
"Braddock, Oldham." "Metrique, London."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited,

Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

GAS TAR wanted.

BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BENZOL, specially made for the Enrichment of Gas.

ELLISON AND MITCHELL, LIMITED, Kilnhurst, near ROTHERHAM.

ENRICH your Gas with cheap Benzol.

Specially prepared, free from sulphur. At to-day's Price of Benzol, ILLUMINATING POWER costs less than ONE-THIRD OF A PENNY PER CANDLE.

Apply to SADLER AND CO., MIDDLESBROUGH.

SULPHURIC ACID for Sale.

BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.

Telegraphic Address: "PORTER, LINCOLN."
[For Illustrated Advertisement, See May 8, p. 1178.

CANNEL, COAL, ETC.

JOHN ROMANS & SON, EDINBURGH,

Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.

Prices, &c., will be forwarded on application
No. 80, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
NEWTON GRANGE, NEWBATTLE, DALKEITH, }

DRAUGHTSMAN, experienced in the design and construction of all kinds of Gas Plant and Buildings, is open to engagement.

Address G. W., care of Street's Agency, 30, CORNHILL, E.C.

TO GAS COMPANIES.

ADVERTISER desires to obtain employment in connection with the Fittings and Prepayment departments of a Gas Company. Has had 19 Years' Experience with a first-class London Firm. Can give excellent References.

Address No. 3491, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Gas-Fitter.

Apply, stating Age and Experience, with Testimonials, to W. COWLEY, Manager and Secretary, Gas-Works, SPENNYMOOR.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. SPECIAL FIRE CEMENT, OXIDE PAINTS, OILS, SULPHURIC ACID, &c.

120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

SADLER & CO., Ltd., Middlesbrough, Tar Distillers and Tar Colour Manufacturers. BENZOL specially prepared for Gas Enrichment free from Sulphur. Pure Hydrated OXIDE OF IRON for Purifying Gas either for Sale or Lent on Hire. Always Buyers of GAS TAR and AMMONIACAL LIQUOR.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.

Before placing Orders, please write for Estimate.
Telegraphic Address: "SATURATORS, BOLTON."

AGENTS wanted, already calling on Gas-Works, for the sale of Oxide of Iron. Good Terms.

Full Particulars, by letter, stating District worked, to No. 3494, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

DRAUGHTSMAN wanted. Permanency for one experienced in the construction of Furnaces, Destructors, &c. Also two JUNIORS.

Apply, by letter only, stating Qualifications and Requirements, to MELDRUM BROS., LIMITED, Atlantic Works, MANCHESTER, S.W.

WANTED, for a Gas-Works in the Midlands making 50 millions, a WORKING FOREMAN. Must understand Regenerative Furnaces, the manufacture of Sulphate of Ammonia, and capable of taking charge of the Works in the absence of the Manager. To an active Young Man desirous of improving his position, the above offers a good opportunity. A total Abstainer preferred. Wages to commence at 35s. per week.

Apply, by letter, stating Age and Experience, and enclosing recent Testimonial, to No. 3496, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Corporation of Halifax are prepared to receive Applications for the post of CHEMIST at their Gas-Works.

Applicants are to state in full their Training, Experience, present Position, and Salary required, accompanied by recent Testimonials as to Character, Industry, and Ability.

Applications, to be endorsed "Chemist," and addressed to the undersigned not later than May 31, 1900.

THOS. HOLGATE, M.Inst.C.E.,
Engineer and Manager.
Corporation Gas-Works, Halifax.

THE Corporation of Halifax are prepared to receive Applications for the post of DRAUGHTSMAN at their Gas-Works.

Applicants are to state in full their Training, Experience, present Position, and Salary required, accompanied by recent Testimonials as to Character, Industry, and Ability.

Applications, to be endorsed "Draughtsman," and addressed to the undersigned not later than May 31, 1900.

THOS. HOLGATE, M.Inst.C.E.,
Engineer and Manager.
Corporation Gas-Works, Halifax.

WANTED, Erectors accustomed to Gasholders and Structural Ironwork.
Apply, with Testimonials, to CLAYTON, SON, AND CO., LTD., Hunslet, LEEDS.

WANTED, as Head Fitter or Outdoor INSPECTOR, an energetic Man, who has a thorough grasp of Main and Service Laying and Fitting, and well able to control Workmen. Wages 35s. to 40s. per week to commence.
Apply to G. HELPS, Gas-Works, NUNEATON.

WANTED, a level-headed and practical Man to LAY OUT new Foundry and SUPERINTEND and take charge of CASTINGS for Gas Cooking-Stoves on up-to-date and economical System. Good and permanent position for suitable person.
Apply, by letter, to No. 3492, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS MANAGERS.

WANTED, a thoroughly qualified MANAGER for Gas-Works, within 25 miles of London. Make about 45 Million Cubic feet per annum.
Apply, by letter, before the 25th inst., stating Age, Salary, and full Record of Experience, to No. 3493, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Port Erin and Port St. Mary Gas Company, Limited, a WORKING MANAGER. Wages, 25s. per week, with free House, Coal, Gas, Water, and Kitchen Garden. Duties to commence on the 3rd of June.
Applications, stating Age and Experience, with *copies* of Testimonials, to JOHN MOORE, jun., Secretary, Athol Street, PORT ST. MARY.

WANTED, a Steady, Reliable Stoker, for Small Gas-Works, accustomed to Shovel Charging and attending to Engine and Exhauster, and to make himself generally useful. Would be required to do from Two to Three Months' Night Work in Summer. Wages 28s. for Seven Months and 26s. for Five Months. None but steady Men need apply.
Apply, by letter, with Testimonials, to No. 3500, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CARLISLE GAS-WORKS.

WANTED, a thoroughly reliable Man as ASSISTANT FOREMAN. Must have good knowledge of Gas Manufacture and the usual routine of a Gas-Works.
Wages 35s. per week.
Applications to be sent to the undersigned not later than May 31.

C. B. NEWTON,
Engineer and Manager.

MERTHYR TYDFIL GAS COMPANY.

RENTAL CLERK.

WANTED, a Young Man as Rental CLERK. Must be experienced in the Accounts and General Routine Work of a Gas Office.
Applications, in own Writing, stating Age, Experience, and Particulars, of last employment, and enclosing *copies only* of two recent Testimonials, to be endorsed, "Rental Clerk," and addressed to the undersigned not later than Saturday, the 26th inst.
Salary £78 per annum.

JOHN L. COCKER,
General Manager and Secretary.
Gas Offices, Gas-Works, Merthyr Tydfil, Glamorganshire, May 2, 1900.

CORPORATION OF ST. IVES (CORNWALL).

APPOINTMENT OF GAS MANAGER AND COLLECTOR.

THE Gas-Works Committee of the above Corporation require a thoroughly qualified WORKING MANAGER and COLLECTOR for their Works (present annual make about 7½ millions). Must thoroughly understand Modern Plant and Apparatus; including Gas-Engine and Exhauster, Laying and Repairs of Mains and Services, Fixing and Reading of Meters, and the Keeping of the Books and Accounts of the Department.
Applications, in Candidates' own Handwriting, stating Age and Salary required, accompanied by two recent Testimonials (*copies* only, which will not be returned), to be sent to the undersigned not later than Saturday, the 26th inst., endorsed "Gas Manager." Canvassing direct or indirect will be a disqualification.

EDWARD BOASE,
Town Clerk.

May 14, 1900.

WANTED, a good second-hand SCRUBBER, 6 feet in diameter, and about 40 feet high.
Position, Price, and Particulars to R. S. CHURCH, Engineer, Gas-Works, CHICHESTER.

GASOLINE.

WANTED, Offers for the supply of 1000 Gallons per month of GASOLINE (·650 sp. gr.), delivered at Granton (Edinburgh).
Offers to be addressed to the SECRETARY, Notkin Syndicate, Limited, 28, Queen Street, EDINBURGH.

DRY GAS-METER (80-Light) for Sale. Second hand. By Thomas Glover and Co., Limited.
Apply, by letter, to No. 3499, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ENGINES and Exhausters combined "Waller," to pass 30,000 cubic feet per hour. DITTO to pass 7000 feet per hour, overhauled and complete. Cheap to clear. Also BOILERS.
J. FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

FOR SALE—Two Lancashire Boilers, each 6 ft. diameter by 20 ft. long, with Mountings. Been in use only a short time. Made by the Yorkshire Engine Company, Limited, Sheffield.
Apply to NEWTON, CHAMBERS, & Co., LIMITED, Thorncliffe Iron-Works, near SHEFFIELD, where the Boilers may be seen.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

CONDENSERS, Washer-Scrubbers, "Cutler" patent CONDENSERS (14) 6 in. to 12 in. PIPE CONDENSERS, Patent WASHERS by "Livesey," "Holmes," and "Cockey," EXHAUSTERS up to 60,000 Cubic Feet per hour. ENGINES, BOILERS, &c. Several TOWER SCRUBBERS, PURIFIERS, METERS, GOVERNORS, PUMPS, TANKS, VALVES, &c.
J. FIRTH BLAKELEY AND CO., Gas Engineers, DEWSBURY.

ISLE OF THANET GASLIGHT AND COKE COMPANY, MARGATE.

THE Directors of the above Company have FOR SALE, consequent upon the Extensions they have made to their Works, the following Second-Hand Plant:—
One EXHAUSTER, capacity per hour, 30,000 Cubic Feet of Gas.
Two EXHAUSTERS, capacity per hour, 25,000 Cubic Feet of Gas each.
Two 6-Horse Power Table STEAM-ENGINES, with Overhead Shafting, Driving-Pulleys, &c., also all Connections, Bye-Pass Valves, Inlet and Outlet Valves, &c., complete.
The whole will be sold as they stand in the Engine-House.
For further Particulars, apply to the Engineer, Mr. James Dougall.
Tenders, addressed to the Chairman, and endorsed "Tender for Engines and Exhausters," to be delivered at these Offices not later than the 31st inst.

By order of the Board,
THOS. C. FULLER,
Secretary.

Offices, The Dane, Margate,
May 19, 1900.

CITY OF RIPON GAS-WORKS.

THE Corporation of Ripon are de- sirous of purchasing the necessary PLANT for the manufacture of SULPHATE of AMMONIA and TAR DISTILLING.
For further Particulars, apply to Mr. Anderson, M.Inst.M.E., Engineer and Manager, Gas-Works, Ripon.
Tenders must be sent in to me on or before Monday, the 28th day of May inst.

M. KIRKLEY,
Town Clerk.

Town Hall, Ripon,
May 15, 1900.

TENDERS FOR COAL AND CANNEL.

THE Gas Department of the Penrith Urban District Council are prepared to receive TENDERS for the supply of COAL and CANNEL during the Year ending June 30, 1901.
Tenders to be delivered to Mr. Geo. Wainwright, Public Offices, Penrith, not later than Tuesday, the 29th inst.
Forms of Tender may be obtained on application.

E. SHAUL,
Manager.

Gas-Works, Penrith,
May 17, 1900.

BUXTON URBAN DISTRICT COUNCIL.

TENDERS FOR TAR AND LIQUOR.

THE Gas Committee invite Tenders for the purchase of the surplus TAR and LIQUOR produced at their Works in Ashwood Dale, for One Year commencing from the 30th of June next.
Further Particulars and Forms of Tender may be obtained of Mr. H. Barker, Engineer, Town Hall, Buxton.
Tenders, endorsed "Tender for Tar and Liquor," to be addressed to the Chairman of the Gas Committee, and delivered not later than noon on the 2nd day of June.
The Council do not bind themselves to accept the highest or any Tender.

By order,
JOSIAH TAYLOR,
Clerk.

BUXTON URBAN DISTRICT COUNCIL.

TENDERS FOR COAL AND CANNEL.

THE Gas Committee invite Tenders for the supply of 6000 Tons of best screened GAS COAL and 4000 Tons of CANNEL, to be delivered at their Siding (on the Midland Railway) in Ashwood Dale, Buxton, at such times and in such quantities as may be required during the Year from the 1st of July, 1900, to the 30th of June, 1901.
Tenders, endorsed "Tender for Coal and Cannel," addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall, Buxton, not later than noon on the 2nd day of June.
Forms of Tender and other Particulars may be obtained of Mr. H. Barker, Engineer, Town Hall, Buxton.
The Council do not bind themselves to accept the lowest or any Tender.

By order,
JOSIAH TAYLOR,
Clerk.

TODMORDEN CORPORATION.

TO COLLIERY PROPRIETORS AND OTHERS.
TENDERS FOR COAL.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply of 14,000 Tons of GAS COAL required at their Works, Todmorden, during a period of Twelve Months, commencing on the 1st day of July next.
Forms of Tender and any further Information may be obtained on application to the Engineer and Manager, Mr. Hy. Hawkins.
Sealed Tenders, endorsed "Gas Coal," addressed to the Chairman, Gas Committee, and delivered at the Town Clerk's Office, Town Hall, Todmorden, not later than Three p.m., on the 29th inst.

By order,
HY. HAWKINS,
Engineer and Manager.

Millwood, Todmorden.

LURGAN GASLIGHT AND CHEMICAL COMPANY, LIMITED.

COAL WANTED.

THE Directors invite Tenders for the supply of 3300 Tons of best quality screened GAS COAL, and 100 Tons of STEAM COAL, delivered into the Works at Lurgan, or placed on Lighters, or on Rail, at Belfast.
Eight Hundred Tons of the required quantity should be Scotch Coal, suitable for use in Hislop's Patent Regenerative Furnaces.
The Coal must be delivered in such quantities and at such times as the Directors may fix; but a large proportion can be taken before the 1st of November.
Each Cargo to be accompanied by a Certificate as to place of origin.
Tenders (in sealed envelope), accompanied by reference to Gas-Works using the Coal offered, should reach me not later than Saturday, the 2nd of June, 1900.
The Directors do not bind themselves to accept the lowest or any Tender.

FRED. W. MAGAHAN,
Secretary.

Gas-Works, Lurgan,
May 7, 1900.

TO TAR DISTILLERS AND OTHERS.

THE Corporation of Birkenhead invite OFFERS for the purchase and removal of the surplus TAR produced at their Gas-Works during a period of One, Three, or Five Years commencing on the 1st of July, 1900.
Deliveries will be made at the Gas-Works either into Contractor's Tanks on the Gas-Works Railway Siding, or into Tanks for conveyance by road to boats.
The Contractor whose Tender is accepted will be required to enter into a formal Contract or Agreement with the Corporation, upon the specific Terms and Conditions contained in the Draft Contract, which has been prepared by the Town Clerk, and deposited in his Office for inspection.
Forms of Tender and further Particulars may be obtained from the Gas Engineer, Mr. T. O. Paterson, C.E., Gas-Works, Thomas Street.
Tenders, which must be on the printed Form supplied, sealed and endorsed "Tender for Tar," to be sent in to me not later than Five p.m. on Thursday, the 31st of May, 1900.
The Corporation do not bind themselves to accept the highest or any Tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
May 16, 1900.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Corporation of Birkenhead are pre- pared to receive TENDERS for the supply of COAL, COAL NUTS, THROUGH and THROUGH CANNEL, and CANNEL NUTS for Gas-Making purposes, for a period of One, Two, or Three Years commencing from the 1st of July, 1900.
Forms of Tender, together with any further Information, may be obtained from Mr. T. O. Paterson, C.E., Gas Engineer, Gas-Works, Birkenhead.
Tenders (accompanied by copy of recent Analysis), stating the Price per ton delivered on to the Gas-Works Railway Siding, must be sent in to me sealed, and endorsed "Tender for Gas-Works Coal," not later than Five o'clock in the Afternoon of Thursday, the 31st of May, 1900.
Also for a supply of STEAM COAL and SLACK to be delivered at the Pumping-Stations of the Spring Hill, Flaybrick Hill, Borough Road, Mount Road, and The Ford Water-Works for a period of One, Two, or Three Years commencing from the 1st of July, 1900.
Forms of Tender, together with any further Information may be obtained from Mr. W. A. Richardson, C.E., Water Engineer, Town Hall, Birkenhead.
Tenders, stating the price per Ton delivered at the various Pumping-Stations, must be sent in to me sealed and endorsed, "Tender for Water-Works Coal," not later than Five o'clock in the afternoon of Thursday, the 31st of May, 1900.
Also for a supply of WASHED SLACK, to be delivered at the Electrical Generating Station, Bentinck Street, for a period of One, Two, or Three Years commencing from the 1st of July, 1900.
Forms of Tender, together with any further Information may be obtained from Mr. W. Bates, Electrical Engineer, Bentinck Street, Birkenhead.
Tenders, stating the price per ton delivered, must be sent in to me, sealed and endorsed "Tender for Washed Slack," not later than Five o'clock in the afternoon of Thursday, the 31st of May, 1900.
All deliveries to be made from time to time according to the requirements of the respective Engineers.
The Corporation do not bind themselves to accept the lowest or any Tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
May 16, 1900.

[For continuation of Contract Advertisements, see p. 1402.

APPLICATIONS FROM CUSTOMERS WILL BE PREFERENTIALLY CONSIDERED ON ALLOTMENT.

No part of this Issue has been or will be Underwritten or Guaranteed.

The List of Applications will open at 10 a.m. on Wednesday, 30th May, 1900, and will close for both Town and Country on Saturday, 2nd June, 1900.

The Davis Gas Stove Company,

LIMITED.

(INCORPORATED UNDER THE COMPANIES ACTS, 1862 TO 1899.)

CAPITAL - - - £150,000,

DIVIDED INTO

15,000 Cumulative 5½ per cent. Preference Shares of £5 each - -	£75,000
15,000 Ordinary Shares of £5 each - - - -	75,000
	£150,000

Of which 2500 Preference and 2500 Ordinary Shares are reserved for future issue.

PRESENT ISSUE

12,500 Preference Shares and 12,500 Ordinary Shares,

Of which Shares 7466 of each class go to the Vendors in part payment of their purchase money, leaving for subscription 5034 Preference Shares and 5034 Ordinary Shares, which are hereby offered, payable as follows:—

£2 per Share on Application.
£1 per Share on Allotment.
£2 per Share at one Month after Allotment.

The Preference Shareholders are entitled to one vote for each Share held by them.

No Debenture to rank in priority to this issue can be created without the consent of the holders of at least three-fourths of the Preference Shares present or represented at a meeting specially convened for the purpose.

Dividends on the Preference Shares are payable half-yearly, on June 30th and December 30th. The first will be payable on December 30th, 1900, and Dividends on both classes of Shares will be calculated from the dates of payment of the instalments.

Directors.

HENRY JOHN DAVIS, Camberwell, Gas Engineer.
CHARLES WILLIAM DAVIS, Camberwell, Gas Engineer.
HENRY ADDIS PRICE, Camberwell, Gas Engineer.
HAROLD NEWSOM DAVIS, Luton, Iron Founder.
CHARLES SILBURN BARBER, Camberwell, *Secretary.*
} *Managing Directors.*

Messrs. H. J. & C. W. Davis and Mr. H. Addis Price are Directors, and Mr. C. S. Barber is Secretary of the Vendor Company, and Mr. H. N. Davis is Manager of the Langley Foundry Company, Limited, of Luton, Beds.

Bankers.

LONDON & SOUTH-WESTERN BANK (Camberwell Green Branch).

Solicitors.

ALLEN & TENNANT, 16, Philpot Lane, E.C.

Brokers.

E. W. MEYERSTEIN & CO., 1, Drapers' Gardens, E.C., and Stock Exchange, E.C.

Auditors.

A. DANGERFIELD & CO., 55, Cannon Street, E.C.

Secretary.

C. S. BARBER.

Registered Offices.

200, CAMBERWELL ROAD, S.E.

PROSPECTUS.

THIS Company is formed to acquire and extend the business of The Davis Gas Stove Company, Limited, of Camberwell, S.E. (herein referred to as the "Vendor Co."), and also to acquire, and amalgamate with it, the business and assets of the Langley Foundry Co., Ltd., of Luton, Beds, and the Foundry and Works known as the Springfield Foundry, Falkirk, Scotland.

The business of the Vendor Co. was established in 1875, as Gas Engineers and Stove Makers, and in 1881 consisted of 200, Camberwell Road, only. It was in 1891 formed into a private limited Company, and has continued to steadily develop and require a constant extension of plant and premises. The Vendor Co. has but recently been obliged to buy the three freehold shops adjoining their extensive frontage in the Camberwell Road, and the shops are now being altered and re-arranged and warehouse built at the rear, with a view to extending warehouse room and frontage.

So continuously has the business increased, that the premises now consist of the following:—

Freehold Factory and Offices, known as 196, 198, and 200, Camberwell Road, and Nos. 21 and 23, Mansion Street.

Freehold Shops, known as 202, 204, and 206, Camberwell Road, now being dealt with as mentioned above.

Leasehold Factory, known as 16a, Wyndham Road, and consisting of 16a, Wyndham Road, and Arches 303 and 304.

Railway Arches, Nos. 305, 306, 307, 308, 309, 310, 311, 312, 313, and 314, at the rear of the Factory, and connected with it by underground passage, and held under lease and agreement.

Leasehold Shop, 13a, Wyndham Road.

There is also a large Show Room, 59, Queen Victoria Street, E.C., specially fitted for the purpose of the business, and held on a yearly tenancy.

The works are very fully equipped with all necessary machinery and plant, and all the work (other than the casting) is done in the numerous workshops on the premises.

With a view to ensuring a supply of castings, the Directors of the Vendor Co. in 1895 acquired a large interest in (and registered as a private Company) the freehold premises, plant, and business of a foundry in Langley Street, Luton, Beds. In addition to Gas Stove Castings the Foundry has a large connection in the general trade for Ranges, Ornamental Railings, Sanitary Castings, &c., &c., and is equipped with every modern appliance, and can turn out 60 tons of light castings per week. The moulding shop covers 25,680 square feet, and the total Buildings cover an area of more than an acre, the large dwelling-house belonging to the Foundry letting at £60 per annum.

The growth of the Vendor Company's business and the general casting trade of the Langley Foundry, make it necessary to increase the working capital and the factory and foundry accommodation. The first want will be met by the £20,000 additional working capital provided by the shares now offered for subscription, and to meet the second want the Vendor Co. has contracted to purchase a large and well equipped foundry at Falkirk, N.B., known as the Springfield Foundry, close to Grahamstown Station on the Stirlingshire Midland Junction Railway, in connection with which the foundry has its own Siding. This foundry has, since the commencement of the business in 1875, supplied to the Vendor Company nearly all the castings for the Metropolitan Stove, and is at present capable of turning out between 80 and 90 tons of light castings per week, and there is room for additional moulding accommodation. There is in connection with the foundry a dwelling-house let at a rental of £38 per annum. The lands on which the foundry stands and its adjacent grounds are held in feu (which is a perpetuity holding) at a total annual rent of £74 9s. 3d., and covers in all an area of over 2 acres. Possession of this foundry is to be given on July 14th, and the purchase money for the buildings, plant, and machinery, and also the legal expenses and stamps, will be borne by the Vendor Co.; this Company taking the benefit of the existing contract for sale.

The businesses of The Langley Foundry Company, Limited, and the Vendor Co. are taken over as going concerns, with the benefit of the trading as to the first

named from 1st October, 1899, and as to the last named from 1st January, 1900, this Company taking over the assets as mentioned below:—

	£	s. d.
The assets to be acquired by this Company consist of—		
The Freehold, Leasehold and Feu Land and Buildings in London, Luton, and Falkirk, together with the Vendor Co.'s interest in the Leasehold Railway Arches in London, the whole valued by Messrs. Fuller, Horsey, Sons, and Cassell at	36,720	0 0
Fixed and loose plant, machinery, and tools in London, Luton, and Falkirk, together with fixtures and fittings at 59, Queen Victoria Street, E.C., valued by Messrs. Fuller, Horsey, Sons, and Cassell at	12,470	0 0
Patterns and drawings at London, Luton, and Falkirk, including patterns at other Foundries, valued by Messrs. Fuller, Horsey, Sons, and Cassell at	5,000	0 0
	54,190	0 0
Stock in trade, including finished and partly finished goods, and all materials and stores at London and Luton, taken at cost price	22,469	10 3
	76,659	10 3
Book debts owing and cash in hand and at Bankers 17,352 0 7		
Less trade liabilities 14,174 1 4		
	3,177	19 3
	79,837	9 6
To which must be added the balance of cash from this issue	20,000	0 0
Making the total net assets exclusive of Goodwill ..	£99,837	9 6

To pay the Dividend on the present issue of Preference Shares will require £3487 10s. per annum, and in view of the £20,000 additional working capital, and after careful consideration of their past trade, and from their intimate knowledge of the same, the Directors are satisfied that the annual profits of the works and foundries when amalgamated will be sufficient to pay the Preference Dividend four times over.

The following is Messrs. Fuller, Horsey, Sons, and Cassell's valuation before referred to:—

11, *Billiter Square, London, E.C., May 3rd*, 1900.

To the Directors of THE DAVIS GAS STOVE COMPANY, LIMITED.

GENTLEMEN,—

In accordance with your instructions, we have attended at **The Metropolitan Engineering Works, Camberwell Road, S.E.; The Langley Foundry, Luton, Beds.**; and **The Springfield Iron Foundry, Falkirk, Scotland,** and have made a careful survey and valuation of same.

The London and Luton Properties are all Freehold and subject to neither Tithe Rate nor Land Tax, with the exception of the railway arches adjoining the Camberwell Works, which are held on Leases and other tenancies. The Works at Falkirk are held in perpetuity, subject to a Feu Duty of £74 9s. 3d. per annum.

We are of opinion that the present fair value as a going concern of the above-mentioned **Freehold Engineering Works** and **Iron Foundries,** together with the whole of the **Fixed** and **Loose Plant** and **Machinery, Patterns and Drawings,** is the sum of **Fifty-four thousand one hundred and ninety pounds (£54,190).**

These figures are inclusive of the fixtures and fittings at Queen Victoria Street, but exclusive of any value for stock, stores, work in progress, book debts, patents, or goodwill.

We are, Gentlemen,

Yours faithfully,

FULLER, HORSEY, SONS, & CASSELL.

The businesses of the Vendor Company and of the Langley Foundry Company, Limited, have been managed from the commencement by the Directors of this Company, and it is owing to their efforts that the businesses have reached their present dimensions. The Directors will continue the management as heretofore, and for their joint managing and secretarial services will receive a fixed salary of £2000 per annum, *plus* 10 per cent. of the net profits earned over and above the sum required to pay the Preference Dividend and a 10 per cent. dividend on the Ordinary Shares.

The total price to be paid for the purchase of the Springfield Foundry and plant, for the business, assets, and goodwill of the Vendor Company, and of The Langley Foundry Company, Limited, has been fixed by the Vendor Company at £105,000 to be satisfied, as to £30,340 part thereof in cash, and as to £74,660 the balance thereof, by the allotment to the Vendor Company of 7466 fully paid-up Preference Shares, and 7466 fully paid-up Ordinary Shares. The Vendor Company will pay all the costs, stamps, and expenses of, and incidental to, the formation and registration of the Company and the issuing of the Prospectus, and will receive interest at 5 per cent. per annum on their purchase-money from the dates the businesses are taken over.

The following contracts have been, or will be, entered into, viz:—

(1) A contract for sale, made between The Davis Gas Stove Company, Limited (thereafter called "the old Company"), and Charles Silburn Barber, the liquidator thereof of the one part, and The Davis Gas Stove Company, Limited (thereinafter called "the new Company"), of the other part, the draft whereof has for the purpose of identification been subscribed by Francis Allen, a Solicitor of the Supreme Court.

(2) A Contract for sale dated 21st May, 1900, and made between The Langley Foundry Company, Limited, of the one part, the persons mentioned in the Schedule thereto of the second part, and Herbert Henry Dashwood of the third part.

(3) A Contract for sale dated 8th and 10th March, 1900, between Malcolm Cockburn, of Springfield Foundry, Falkirk, N.B., of the one part, and The Davis Gas Stove Company, Limited (being the old Company), of the other part.

The respective businesses are taken over subject to all existing contracts and engagements. These fall technically within Section 38 of the Companies Act, 1867, but have reference only to the ordinary business of the respective Companies, and cannot in the interests of this Company be specified here. Applicants for shares will be deemed to have had notice of all these contracts, to have waived their rights, if any, to further particulars thereof, and to have agreed with the Company, as trustee for the Directors and other persons liable, not to make any claim whatever, or to take any proceedings under the said section in respect of any non-compliance therewith.

The Contracts specified above, the Memorandum and Articles of Association of the Company, and Messrs. Fuller, Horsey, Sons, & Cassell's valuation, can be seen at the offices of Messrs. Allen & Tennant, 16, Philpot Lane, London, E.C.

Application will be made in due course to the Stock Exchange for a settlement for both classes of shares.

Applications for Shares should be made on the form below, and be forwarded **to the Bankers** with the amount payable on application.

If no allotment is made the deposit will be returned in full, and where the number of shares allotted is less than the number applied for, the balance will be applied towards the payment due on allotment, and final call.

Failure to pay any instalments on the shares will render the previous payments liable to forfeiture.

Copies of the Prospectus, with Forms of Application for Shares, can be obtained at the Registered Offices of the Company, and from the Bankers, Brokers, Accountants, and Solicitors of the Company.

200, CAMBERWELL ROAD, S.E.,
18*th May*, 1900.

THE DAVIS GAS STOVE COMPANY, LIMITED.

(*Incorporated under the Companies Acts*, 1862 *to* 1898.)

FORM OF APPLICATION FOR PREFERENCE SHARES.

To the Directors of THE DAVIS GAS STOVE COMPANY, LIMITED.

GENTLEMEN,

Having paid to the Company's Bankers the sum of £_____ being a deposit of £2 per Share on_____5½ per cent. Cumulative Preference Shares of £5 each in the above Company, I request you to allot me that number of such Preference Shares, and agree to accept the same, or any smaller number that may be allotted to me upon the terms of the Company's Prospectus, dated 18th May, 1900, and to pay £1 per Share on allotment and the balance of £2 per Share one month after allotment, as provided by the said Prospectus, and I authorize you to register me as the holder of the said Preference Shares, and I waive any fuller compliance with Section 38 of the Companies Act, 1867, or otherwise, than that contained in such Prospectus.

*Name (in full)*_____

*Address*_____

*Description*_____

*Date*_____1900.

Kindly make Cheque payable to the Bankers.

THE DAVIS GAS STOVE COMPANY, LIMITED.

RECEIPT FOR DEPOSIT

(To be returned to the Applicant).

Received *the*_____*day of*_____1900,

*from*_____

the sum of £ : : , being a deposit of £2 per Share upon

_____*Preference Shares in the above-named Company.*

For the LONDON & SOUTH-WESTERN BANK, LIMITED,

STAMP

£ : :

This Form must be sent entire with remittance to the Company's Bankers, the London & South-Western Bank, Limited, CAMBERWELL GREEN BRANCH.

THE DAVIS GAS STOVE COMPANY, LIMITED.

(*Incorporated under the Companies Acts*, 1862 *to* 1898.)

FORM OF APPLICATION FOR ORDINARY SHARES.

To the Directors of THE DAVIS GAS STOVE COMPANY, LIMITED.

GENTLEMEN,

Having paid to the Company's Bankers the sum of £_____ being a deposit of £2 per Share on_____Ordinary Shares of £5 each in the above Company, I request you to allot me that number of such Ordinary Shares, and agree to accept the same, or any smaller number that may be allotted to me upon the terms of the Company's Prospectus, dated 18th May, 1900, and to pay £1 per Share on allotment and the balance of £2 per Share one month after allotment, as provided by the said Prospectus, and I authorize you to register me as the holder of the said Ordinary Shares, and I waive any fuller compliance with Section 38 of the Companies Act, 1867, or otherwise, than that contained in such Prospectus.

*Name (in full)*_____

*Address*_____

*Description*_____

*Date*_____1900.

Kindly make Cheque payable to the Bankers.

THE DAVIS GAS STOVE COMPANY, LIMITED.

RECEIPT FOR DEPOSIT

(To be returned to the Applicant).

Received *the*_____*day of*_____1900,

*from*_____

the sum of £ : : , being a deposit of £2 per Share upon

_____*Ordinary Shares in the above-named Company.*

For the LONDON & SOUTH-WESTERN BANK, LIMITED,

STAMP

£ : :

This Form must be sent entire with remittance to the Company's Bankers, the London & South-Western Bank, Limited, CAMBERWELL GREEN BRANCH.

THE Directors of the Camborne Gas Company, Limited, invite TENDERS for the supply of 1000 Tons of GAS COAL, f.o.b. to their order at any period within the next Twelve Months from the 1st prox.

Tenders should be addressed to the undersigned on or before the 29th inst.

The lowest or any Tender not necessarily accepted.

W. BAILEY,
Secretary.

Dated Gas-Works, Camborne,
May 19, 1900.

CITY OF CARLISLE.

THE Carlisle Gas Committee are prepared to receive TENDERS for the supply of COAL and CANNEL required at their Works during One Year from the 1st of July next.

Tenders to be delivered to the undersigned not later than June 2, 1900.

Forms of Tender and other Particulars on application.

C. B. NEWTON,
Engineer and General Manager.

Gas-Works, Carlisle,
May 12, 1900.

CITY OF CARLISLE.

THE Carlisle Gas Committee are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Works for a period of One Year from the 1st of July next.

Tenders to be delivered to the undersigned not later than June 2, 1900.

Further Particulars can be obtained on application.

C. B. NEWTON,
Engineer and General Manager.

Gas-Works, Carlisle,
May 12, 1900.

COUNTY BOROUGH OF BLACKBURN.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Surplus TAR made at their Works during the Year ending the 30th of June, 1901.

The estimated Quantity is 2600 Tons; and Tenders are to state a price for same delivered into Tank-Waggons at the new Gas-Works Sidings, Greenbank.

Forms of Tender may be obtained from the undersigned, and to be delivered in sealed envelopes, endorsed "Tar," before Saturday, the 26th of May, 1900.

S. R. OGDEN,
Engineer and Manager.

Gas Department,
Municipal Offices, Blackburn,
May 15, 1900.

BRIERLEY HILL DISTRICT GASLIGHT COMPANY.

TENDERS FOR COAL.

THE Directors are prepared to receive TENDERS for the supply of 7000 Tons of GAS COAL, delivered to Brettell Lane or Round Oak Siding (G.W.R.), in such quantities as may be required from the 1st of July next to the 30th of June, 1901.

Tenders, stating Price per ton (20 cwt.), delivered to the above-mentioned Stations, with latest Analytical Test, to be sent, addressed to the Chairman of the Company, and marked "Tender for Coal," not later than the 26th inst.

The Directors reserve the right to accept Tenders for the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.

No Tender Forms issued.

By order,
HENRY M. JACKSON,
Secretary.

Board-Room, Gas-Works,
Brierley Hill, May 14, 1900.

TENDERS FOR TAR.

THE Directors of the Clayton, Allerton, and Thornton Gas Company are prepared to receive TENDERS for the purchase of the COAL TAR produced at these Works during a period of Twelve Months from the 1st day of July, 1900, to the 30th of June, 1901.

Quantity, about 400 Tons.

The Tar will have to be removed daily from the 1st of October to the end of April.

Sealed Tenders, endorsed "Tender for Tar," addressed to the Chairman at the Gas-Works, to be delivered at or before Noon, on Monday, the 11th of June, 1900.

The Directors do not pledge themselves to accept the highest or any Tender.

By order,
JOHN NIVEN,
Secretary and Manager.

Gas-Works, Clayton, near
Bradford, May 8, 1900.

TENDERS FOR GAS COAL.

THE Directors of the Clayton, Allerton, and Thornton Gas Company invite TENDERS for the supply of 8000 Tons of GAS COAL, screeneed and unscreened, and 1000 Tons of CANNEL COAL. The Coal to be free from Scale, Sulphurous Pyrites, or other objectionable matter, and to be delivered at the Gas-Works, Low Lane, Clayton, or at the Great Northern Railway Station, Clayton, in such quantities weekly as may be ordered by the Company's Manager, during the next Twelve Months. The said Tenders to state the Seam and the Pit from which the Coal is intended to be sent.

Sealed Tenders, endorsed "Tender for Gas Coal," addressed to the Chairman at the Gas-Works, to be delivered at or before Noon on Monday, the 11th day of June, 1900.

The Directors do not pledge themselves to accept the lowest or any Tender, reserving to themselves the right to divide the contracts as they may think proper.

By order,
JOHN NIVEN,
Secretary and Manager.

Gas Offices, Clayton, near
Bradford, May 8, 1900.

RADCLIFFE AND PILKINGTON GAS COMPANY.

TENDERS FOR COAL AND CANNEL.

THE Directors of the Radcliffe and Pilkington Gas Company invite TENDERS for about 14 000 Tons of GAS COAL and CANNEL.

Particulars may be obtained from the undersigned, to whom Tenders, properly endorsed, must be delivered on or before Friday, the 1st of June.

JAMES BRADDOCK,
Manager and Secretary.

Gas Offices, Radcliffe,
May 17, 1900.

GOOLE URBAN DISTRICT COUNCIL.

TENDERS are invited for the supply of 5000 to 6000 Tons of best screened GAS COAL.

Full Particulars and copy of Conditions may be had on application to the undersigned.

Sealed and endorsed Tenders, to be sent to Mr. George England, Clerk to the Goole Urban District Council, Chapel Street Offices, Goole, on or before Twelve o'clock noon, Monday, May 28, 1900.

By order,
MATT. DUNN, M.Inst.M.E.,
Engineer.

Engineer's Office, Doyle Street, Goole.

KING'S LYNN GAS COMPANY.

THE Directors of the King's Lynn Gas Company invite TENDERS for the supply of about 7000 Tons of GAS COAL or NUTS, for delivery from July 1, 1900, to June 30, 1901.

Tenders, endorsed "Coal," stating Price f.o.b. the Company's Steamboats in Tyne or elsewhere, or f.o.r. Harbour Siding, King's Lynn, to be sent to the undersigned not later than June 2, 1900.

EDMUND G. SMITHARD,
Engineer.

Gas-Works, King's Lynn,
May 19, 1900.

CORPORATION OF WOKINGHAM.

TENDERS FOR GAS COAL.

THE Gas Committee invite Tenders for the supply and delivery at Wokingham of 1000 Tons of GAS COAL, screened or unscreened, during the Year ending the 31st of May, 1901, in quantities to be arranged.

Tenders to be sent in by the 29th of May next.

The Committee do not bind themselves to accept the lowest or any Tender.

A. G. BATES,
Secretary and Manager.

Gas Offices, Wokingham,
May 16, 1900.

BOROUGH OF NEWBURY.
(GAS DEPARTMENT.)

THE Gas Committee of the Newbury Corporation invite TENDERS for the supply of about 3600 Tons of Best GAS COAL and 250 Tons of a good class CANNEL during the period ending June 30, 1901, to be delivered free to Newbury Station on the G. W. Railway in such quantities as may be agreed.

Tenders to state full Particulars of the Coal and Cannel offered, to be endorsed "Tender for Coal," and addressed to the Chairman of the Gas Committee, Gas Offices, Newbury, and delivered not later than the 1st day of June next.

The Committee do not bind themselves to accept the lowest or any Tender.

No particular form issued.

WM. R. DAVEY,
Manager.

Gas-Works, Newbury,
May 15, 1900.

PAIGNTON GAS COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the Paignton Gas Company are prepared to receive TENDERS for the supply of about 2000 Tons (or such other quantity as may be agreed on) of best approved GAS COALS, in such monthly quantities as may be required by the Company.

Tenders to state the Price of the Coal, delivered at Paignton Station, Great Western Railway, free of all charges.

The Directors do not bind themselves to accept the lowest or any Tender.

Further Particulars may be obtained on application to Mr. C. G. Dawson, the Company's Manager.

Sealed Tenders, endorsed "Tender for Coal," specifying the description and quality of Coal, to be sent on or before the 9th of June addressed to the undersigned, Gas Offices, 5, Victoria Street, Paignton.

F. W. PUDDICOMBE,
Secretary.

Paignton, May 19, 1900.

COUNTY BOROUGH OF HUDDERSFIELD.

TENDERS FOR GAS COAL AND NUTS.

THE Gas Committee are prepared to receive TENDERS, from Colliery Proprietors only, for the supply and delivery of about 60,000 Tons of unscreened GAS COAL and screened NUTS for a period of Twelve Months, commencing the 1st of January, 1901.

Full Particulars and Form of Tender may be obtained on application to the Gas Engineer and Manager (Mr. E. A. Harman, M.Inst.C.E.), Leeds Road, Huddersfield.

Sealed Tenders, endorsed "Tender for Gas Coal," must be delivered, free of charge, addressed, in the handwriting of the Tenderer or his Agent, to the Town Clerk, Town Hall, Huddersfield, not later than Tuesday, the 12th of June, 1900.

The Corporation do not bind themselves to accept the lowest or any Tender.

By order,
F. C. LLOYD,
Town Clerk.

Town Hall, Huddersfield,
May 18, 1900.

TO COAL CONTRACTORS.

THE Kineton Gaslight, Coal, and Coke Company, Limited, invite TENDERS for not less than 400 Tons of well-screened SILKSTONE GAS COAL, delivered at their Works as required during Twelve Months, from July 1, 1900.

Tenders, to be addressed to the SECRETARY of the Company, Kineton, WARWICK, by May 28.

OSWALDTWISTLE URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL.

THE Council invite Tenders for the supply of 4000 Tons of screened GAS COAL during the Twelve Months ending June 30, 1901.

Further Particulars may be obtained from the undersigned.

Sealed Tenders, endorsed "Tender for Gas Coal," to be sent to the undersigned, not later than the 30th of May inst.

BENJN. T. WESTWELL,
Clerk.

Town Hall, Oswaldtwistle,
(Lancs.), May 10, 1900.

COUNTY BOROUGH OF BOLTON.
(GAS DEPARTMENT.)

TENDERS FOR COAL AND CANNEL.

THE Gas and Lighting Committee invite TENDERS for the supply of Screened GAS COAL, COBBLES, and CANNEL required during the Year ending the 30th of June, 1901.

Specification and Form of Tender may be obtained on application to Mr. William Walch, Office Superintendent, Gas Offices, Bolton.

Sealed Tenders, endorsed "Tender for Coal," to be addressed to Alderman John Miles, Chairman, and to be delivered at the Gas Offices, Bolton, not later than Thursday, the 31st of May inst.

The Committee do not bind themselves to accept the lowest or any Tender.

R. G. HUMELL,
Town Clerk.

Town Hall, Bolton,
May 17, 1900.

SCARBOROUGH GAS COMPANY.

AMMONIACAL LIQUOR.

THE Directors of the Scarborough Gas Company invite TENDERS for the whole of the AMMONIACAL LIQUOR, to be produced at their Works for One or more Years from the 1st day of July next.

Tenders may be submitted either at a fixed Price per Ton or on a Sliding-Scale, regulated by the price of Sulphate. Preference will, however, be given to the latter.

Further Particulars may be obtained on application to the underigned.

Tenders (duly endorsed) must be delivered, addressed to the Chairman of the Company, not later than Noon, on Saturday, the 9th of June next.

The Directors do not bind themselves to accept the highest or any Tender.

By order,
J. HOLLIDAY,
Engineer and Secretary.

Gas Offices: 32, Westborough,
Scarborough, May 16, 1900.

EXMOUTH GAS COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the Exmouth Gas Company invite TENDERS for 3000 Tons of clean unscreened (through and through) first-class DURHAM or ANY OTHER GOOD GAS COAL, to be shipped in such quantities (by Sailing Vessels only), and at such times as may be required, commencing from the 1st of August next.

Tenders to be accompanied by practical Working Analysis, and Prices may be quoted c.i.f. or f.o.b. at Exmouth Docks.

Sealed Tenders to be sent to the undersigned, addressed to the Chairman of the Company, and endorsed "Tender for Coal," not later than Thursday, the 31st day of May.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender (no special Form of Tender issued).

By order,
JAMES T. FOSTER,
Secretary and Manager.

Gas-Works, Exmouth,
May 8, 1900.

GLOUCESTER GASLIGHT COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the above Company invite TENDERS for the supply of about 30,000 Tons of GAS COAL for One Year from the 1st day of July next, in such monthly quantities as may be required by the Company.

Tenders to state the price delivered at the Midland Railway Wharf, High Orchard, or the Great Western Railway Wharf, Llanthony, Gloucester; or if sent (as preferred) by Water, the price f.o.b., and also the price delivered at the Gas Company's Wharf on the Gloucester and Berkeley Canal.

Further Particulars and Forms of Tender may be obtained of the undersigned.

Sealed Tenders, endorsed "Tender for Coal," specifying the description and quality of the Coal, to be addressed to the Chairman, Gas Offices, Eastgate Street, Gloucester, and delivered not later than the 4th day of June next.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.

By order,
WILLIAM E. VINSON,
Secretary.

Gas Offices, Gloucester,
May 3, 1900.

THE Directors of the Ware Gaslight and Coal and Coke Company, Limited, invite TENDERS for the supply of from 1600 to 2400 Tons of BARROW, SILKSTONE, and EAST PONTOP GAS COALS, to be considered at their Meeting to be held on Tuesday, the 5th day of June, 1900.

Full Particulars may be obtained on application to me the undersigned at my Office.

By order of the Board,
GEO. H. GISBY,
Secretary.

Town Hall, Ware, Herts.

THE Directors of the Tewkesbury Gas Company, Limited, are open to receive TENDERS for the whole or part of 1500 Tons of best screened GAS COAL, delivered, free on rails, at Tewkesbury Station as required, during Twelve Months ending the 30th of June, 1901.

Sealed Tenders to be addressed to the undersigned on or before the 31st inst.

The Directors do not bind themselves to accept the lowest or any Tender.

RALPH CHANDLER,
Secretary.

Gas Offices, Tewkesbury,
May 21, 1900.

MALTON GAS COMPANY.

TENDERS FOR COALS.

THE Directors invite Tenders for the supply of about 5000 Tons of GAS COALS, COBBLES, or NUTS, delivered at the North-Eastern Railway Company's Depôt, Malton, during the Year ending the 30th of June, 1901.

Payments will be made monthly.

Tenders to be sent in on or before Saturday, the 26th of May inst.

The Directors do not bind themselves to accept the lowest or any Tender.

HENRY TOBEY,
Secretary.

Malton, Yorks.

BOROUGH OF DARWEN.

TENDERS FOR GAS COAL.

THE Corporation are prepared to receive TENDERS for the supply of GAS COAL, for One, Two, or Three Years, to be delivered at the Gas-Works Siding in the Corporation Waggons.

Forms of Tender and all Information as to quantities may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Gas Coal," must be delivered to the undersigned at or before noon, Saturday, May 26, 1900.

No Tender necessarily accepted.

By order,
CHAS. COSTEKER,
Town Clerk.

Town Clerk's Office, Darwen.
May 2. 1900.

BOROUGH OF DARWEN.

THE Corporation are prepared to receive TENDERS for all the surplus GAS TAR produced at their Gas-Works for One Year.

Also for the supply of the following Goods for One Year:—

(1) OILS and PAINTS.
(2) VITRIOL.
(3) WROUGHT-IRON TUBES and FITTINGS.
(4) CAST-IRON MAINS and SPECIALS.
(5) LEAD PIPE.

Particulars as to Quantities may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed and endorsed Tenders must be delivered to the undersigned at or before noon, Saturday, May 26, 1900.

No Tender necessarily accepted.

By order,
CHAS. COSTEKER,
Town Clerk.

Town Clerk's Office, Darwen,
May 2, 1900.

BOROUGH OF RAMSGATE.
(GAS DEPARTMENT.)

THE Gas and Water Committee desire TENDERS for the construction of a RETORT-HOUSE; also IRON ROOF, JOISTS, &c.

Specifications and Quantities may be obtained from William A. M'Intosh Valon, Gas Offices, Ramsgate, on payment of £5 5s., which will be returned on receipt of a *bond-fide* Tender, together with Specifications and Quantities fully priced out.

Tenders must be sent in, addressed to the Chairman of the Gas and Water Committee, Boundary Road, Ramsgate, not later than Ten a.m. on Monday, June 11, 1900.

The Committee do not bind themselves to accept the lowest or any Tender.

W. A. HUBBARD,
Town Clerk.

SOWERBY BRIDGE URBAN DISTRICT COUNCIL.

TENDERS FOR COAL AND CANNEL.

THE Gas Committee are desirous of receiving TENDERS for 14,900 Tons of COAL or less, and 1200 Tons of CANNEL, as may be required, for the Gas-Works at Sowerby Bridge and Luddenden Foot for the Year ending May 31, 1901.

Specifications and Forms of Tender can be obtained by applying to Mr. John Marsland, Engineer and Manager, Gas-Works, Sowerby Bridge.

The Gas Committee do not bind themselves to accept the lowest or any Tender.

Tenders must be sent in not later than Saturday, the 26th of May, 1900, endorsed "Tender for Coal," or "Cannel," respectively, and addressed to

GODFREY RHODES AND EVANS,
Clerks to the Council.

Commercial Bank Chambers,
Halifax, May 8, 1900.

BOROUGH OF DUKINFIELD.
(GAS DEPARTMENT.)

TENDERS for Tar produced at the Dukinfield Gas-Works in the Year commencing the 1st of July are required by the 26th inst.

Quantity about 500 Tons, delivered free on boat.

Tenders to be sealed and endorsed "Tar."

HARRISON VEEVERS, C.E.,
Engineer and Secretary.

Dukinfield,
May 12, 1900.

FARNWORTH AND KEARSLEY GAS COMPANY.

TENDERS FOR COAL AND CANNEL.

THE Directors of this Company invite TENDERS for the supply of COAL and CANNEL for delivery between the 1st of July, 1900, and the 30th of June, 1901.

Forms of Tender and Specification can be had from the undersigned.

Sealed Tenders to be addressed to the Chairman, J. W. Watkinson, Esq., and to be delivered on or before the 30th of May next.

THOS. LEA SHEPPARD,
Manager.

Gas Offices, Farnworth,
May 9, 1900.

ACCRINGTON DISTRICT GAS AND WATER BOARD.

THIS Board invite Tenders for the Surplus TAR and AMMONIACAL LIQUOR which may be produced at the Accrington and Great Harwood Works of the Board during the Year July 1 to June 30, 1901.

The estimated Quantity of Tar is 1700 Tons and Liquor 4500 Tons.

Sealed Tenders, endored "Tar and Liquor," addressed to the Chairman of the Board, must be in my hands on or before the 11th of June.

Forms of Tender may be obtained on application.

CHAS. HARRISON,
General Manager.

General Offices, Accrington,
May 15, 1900.

COUNTY BOROUGH OF HALIFAX.

THE Gas-Works Committee invite TENDERS for the supply of 80,000 Tons of GAS COAL and 10,000 Tons of CANNEL COAL, to be supplied in such quantities as may from time to time be determined by the Gas-Works Committee during the Twelve Months ending the 30th of June, 1901.

Forms of Tender and further Information may be obtained on application to Mr. Thomas Holgate, M.Inst.C.E., Gas Engineer, Halifax.

Tenders, endorsed "Tender for Coal," must be sent to the undersigned before Two o'clock p.m., on Wednesday, May 30, 1900.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
KEIGHLEY WALTON,
Town Clerk.

TUNBRIDGE WELLS GAS COMPANY.

SALE OF £5000 "D" STOCK
(NOW PAYING 8½ PER CENT. PER ANNUM.)

PURSUANT TO THE "TUNBRIDGE WELLS GAS ACT, 1887."

MR. WM. ROPER will sell by Auction, at The Pump Room, Tunbridge Wells, on Friday, June 8, 1900, at Four o'clock in the Afternoon precisely,

£5000
"D" STOCK
IN THE TUNBRIDGE WELLS GAS COMPANY,

In 10 Lots of £50 each, and 45 Lots of £100 each.

The Standard Rate of Dividend authorized to be paid in respect of this Stock is £7 per cent. per annum; but under the operation of the Sliding-Scale, Dividends to the extent of 8½ per cent. have been paid on this Stock since 1894.

Dividend on this Stock will commence to accrue as from the 1st day of August next.

The Tunbridge Wells Gas Company have for many Years paid the full amount of Dividends authorized by the Acts of Parliament; and the Auctioneer recommends the Stock now offered as a safe and particularly advantageous investment.

Further Particulars and Conditions of Sale may be had, and the Tunbridge Wells Gas Acts may be inspected, at the Offices of Messrs. STONE, SIMPSON, and STONE, Solicitors, Church Road; of the AUCTIONEER, Kentish Buildings, 6, London Road; and of the Secretary, Mr. JOHN READ, at the Offices of the Company, 41, High Street, TUNBRIDGE WELLS.

"GAS, AND HOW TO USE IT."

A useful little Brochure, suitable for Distribution among Gas Consumers in the District of any Gas Company

BY

J. H. TROUGHTON.

Sample Copies 6d. *each.*

100, £2; 250, £4 10s.; 500, £7 10s.; 1000, £10.

The Pamphlet can be specialized to suit the Price of Gas and other Conditions of supply in any particular District, at a slightly increased Charge.

Prices for larger quantities of the Publisher:
WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
PLYMOUTH AND STONEHOUSE GAS COMPANY.

NEW ISSUE OF £4500 ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Wednesday, May 23, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
MAIDSTONE GAS COMPANY.

£10,370 THREE PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Wednesday, May 23, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Executors of the late W. H. H. Broadberry, Esq.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Wednesday, May 23, at Two o'clock,

GAS AND WATER STOCKS AND SHARES
OF THE
TOTAL CAPITAL VALUE OF ABOUT £4000,
IN THE

Tottenham and Edmonton Gas Company, Southend Gas Company, West Surrey Water Company, Barnet District Gas and Water Company, Romford Gas and Coke Company, Horley District Gas Company, Woking Water and Gas Company, Harrow and Stanmore Gas Company, Waltham Abbey and Cheshunt Gas Company, Colney Hatch Gas Company, Buntingford Gas Company, St. Margaret's Gas Company, and the South African Lighting Association.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTHEND GAS COMPANY.

ISSUE OF £4500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK, AND £750 NEW ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, June 12, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
WALTON-ON-THAMES AND WEYBRIDGE GAS COMPANY.

NEW ISSUE OF 170 £10 "B" SHARES.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, June 12, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
HERNE BAY GAS AND COKE COMPANY, LTD.

NEW ISSUE OF 1000 £5 ORDINARY SHARES.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, June 12, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
CRAWLEY GAS COMPANY, LIMITED.

THE FREEHOLD GAS-WORKS SITUATE AT CRAWLEY, SUSSEX.

Conveniently placed close to the Main Road, within about half-a-mile of Crawley Station on the London, Brighton, and South-Coast Railway, and comprising Retort-House (with Nine Retorts), Two Gasholders, Purifiers, Scrubber, Coal-Store, Lime-Shed, Tar-Well, Meter and Governor House, Manager's House, together with the Mains to a length of about 3½ miles, Meters, Services, and Tools. The whole to be sold as a going concern, and with possession on completion.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, Tokenhouse Yard, E.C., on Tuesday, June 12, 1900, at Two o'clock.

Particulars of the SECRETARY of the Company, at the Offices, High Street, CRAWLEY; of Messrs. HOLMES, LEAR, AND BELDAM, Solicitors, ARUNDEL; and of Mr. ALFRED RICHARDS, Auctioneer, 18, FINSBURY CIRCUS, E.C.

EAST LONDON WATER-WORKS COMPANY.

ISSUE OF £198,788 THREE PER CENT. DEBENTURE STOCK,

BEING THE BALANCE OF THE CAPITAL CREATED UNDER THE COMPANY'S STATUTORY POWERS.

NOTICE is Hereby Given, that the Directors are prepared to receive TENDERS for the above ISSUE, bearing Interest at 3 per cent. per annum, less Income-Tax, and redeemable at par after the expiration of 25 Years from the date of issue, subject to Six Months' Notice being given by the Company.

Tenders must be delivered at the Company's Offices, 15A, St. Helen's Place, Bishopsgate Street, E.C., not later than One o'clock p.m., on Monday, the 11th of June ensuing.

Particulars and Conditions, together with Form of Tender, may be obtained at the said Offices, or will be forwarded on application.

By Order of the Court of Directors,
I. A. CROOKENDEN,
Secretary.

15A, St. Helen's Place, Bishopsgate Street,
London, E.C., May 14, 1900.

THE BRISTOL GAS COMPANY.

IMPORTANT ISSUE
OF
GENERAL CAPITAL STOCK
AND
NEW DEBENTURE STOCK.

GEO. NICHOLS, HOWES, YOUNG, ALDER, & CO., are instructed to SELL by PUBLIC AUCTION, at their SALE ROOMS, 49, BROAD STREET, Bristol, on THURSDAY, the 14th day of June, 1900, at 2.30 p.m. precisely,

IN LOTS OF £100 EACH,
£10,000
FIVE PER CENT. MAXIMUM
GENERAL CAPITAL STOCK,
ALSO
£5000
NEW DEBENTURE STOCK
(Bearing Interest at the Rate of Four Pounds per Centum per Annum, payable Half Yearly in June and December),
OF AND IN
THE BRISTOL GAS COMPANY,

Issued by the Company under their Statutory Powers.

The Stock will be Sold and Registered in the Books of the Company *Free of Every Expense* to Purchasers thereof.

Full Particulars and Conditions of Sale may be obtained of the Auctioneers, 49, Broad Street, Bristol; Messrs. Brittan, Livett, and Miller, Solicitors, Albion Chambers, Bristol; or of

JOHN PHILLIPS,
Secretary.

Chief Office, Canons' Marsh, Bristol.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER.

Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.

Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD
BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

GAS PLANT New or 2nd Hand Equipments for Coal Gas, Water Gas, Oil, Acetylene, Coke Oven, and Blast Furnace Gas.

POWER or LIGHT WORKS.

Also **VALUATION** Consultation, Inspection & Expert Reports.

JAS. WRIGHT, M.I.M.E. BRIDGE HOUSE, BLACKFRIARS, E.C.

HARDMAN & HOLDEN, LD.
ESTABLISHED 1820.
SULPHURIC ACID.

GUARANTEED absolutely free from Arsenic and of excellent Purity. Specially prepared for Sulphate of Ammonia Manufacturers.

Works: BLACKBURN; Miles Platting and Clayton, MANCHESTER.

Head Office: Miles Platting, MANCHESTER.
Inquiries Solicited.

BOLDON GAS COALS.

Yield of Gas per Ton. .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

As per Analysis by
Mr. JOHN PATTINSON, F.I.C., F.C.S.

For Prices, &c., apply to
W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON, NEWCASTLE."

THOMAS TURTON AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

THORNLEY GAS COALS
WORKED BY THE
WEARDALE IRON & COAL CO., LD.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON.

Yield of Gas per Ton . .	10,500	Cub. Ft.
Illuminating Power . . .	16·9	Candles.
Coke (of good quality) . .	67·5	per Cent.
Sulphur	0·58	,,
Ash	2·73	,,

For Price, &c., apply to the
WEARDALE IRON & COAL CO., LD.
QUAYSIDE, NEWCASTLE-ON-TYNE.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and Yield of Gas.

Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,
CHESTERFIELD.

JAMES OAKES & CO.
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts and Covers, and rendering Leakage impossible.

LONDONDERRY GAS COALS
FROM THE
LONDONDERRY COLLIERIES,
COUNTY OF DURHAM.

Available Output up to 5000 Tons per day.
Yield of Gas 11,000 cubic feet per Ton of Coal as per Analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO
S. J. DITCHFIELD,
SEAHAM HARBOUR,
COUNTY OF DURHAM.

HOLMSIDE
GAS COALS.

Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . .	11,205 Cubic Feet.
Illuminating Power	16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality)	13¾ Cwt. per Ton.
Sulphur	A little over 1 per Cent.
Ash	Under 1 per Cent.
Tar	163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor	103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR
PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

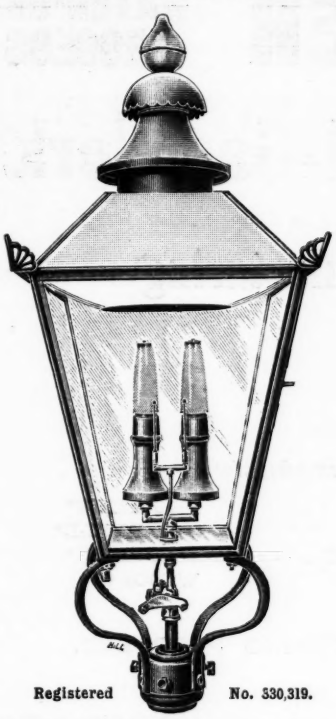
Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE & SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

THE

"KILBURN" LANTERN.



Registered No. 330,319.

Fitted with Steel Enamelled White Reflector.

H. GREENE & SONS, LTD.
19, FARRINGDON ROAD, E.C.
Telephone: 1215 HOLBORN. Telegrams: "LUMINOSITY."

NITRATE of Thorium and Cerium.
FABRIK CHEMISCHER PRAEPARATE VON STHAMER, NOACK, AND CO., HAMBURG.

HOT WATER INSTANTLY
NIGHT OR DAY.
Hot Bath when wanted.
Boiling Water in a Minute.
EWART'S
'LIGHTNING' GEYSER
For Gas or Oil.
346, EUSTON ROAD, LONDON.
Illustrated Price List Free.

WELDON MUD
FOR
GAS PURIFICATION,
For use in the
RECOVERY OF SULPHUR,
ALSO
Removal of last Traces of SULPHURETTED HYDROGEN in catch position.

Full Particulars on application to the Patentees:
GAS DESULPHURIZATION CO.,
— LIMITED, —
1, FENCHURCH AVENUE, LONDON, E.C.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE
BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

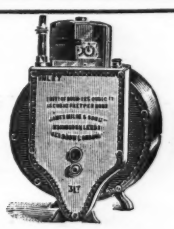
Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to
THOS. W. DANCE, SON, & HUNTER
COAL OWNERS, NEWCASTLE-ON-TYNE;
OR
E. FOSTER & CO.,
21, JOHN STREET, ADELPHI, LONDON, W.C.

JAMES MILNE & SON, LTD.,
GAS ENGINEERS
MILTON HOUSE WORKS EDINBURGH.
LONDON. —— LEEDS. —— GLASGOW.



THE WIGAN COAL & IRON CO., LIMTD.,
Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.
Midland and West of England District Office: 6, CORPORATION STREET, BIRMINGHAM—Sole Agent: A. C. SCRIVENER.
Telegraphic Address: "WIGAN, BIRMINGHAM." Telephone No. 200.
London District Office: 6, STRAND, LONDON—C. PARKER & SON, Sole Agents.
Telegraphic Address: "PARKER, LONDON."

WORKMANSHIP and MATERIALS OF THE HIGHEST QUALITY.

PECKETT'S LOCOMOTIVES
Built to any Specification or Gauge.
PECKETT & SONS, Atlas Locomotive Works, BRISTOL.

THE

DELLWIK-FLEISCHER WATER-GAS PROCESS

FOR

Increasing the Capacity of Coal-Gas Works

ALSO FOR

Incandescent Lighting and Manufacturing Purposes

(PATENTS IN ALL COUNTRIES).

Plants contracted for within the last Eighteen Months for the following Gas-Works :—

KÖNIGSBERG	ISERLOHN	LYONS	BRUMMEN*
ERFURT	REMSCHEID	BERNE	OSTERFELD*
PLAUEN	PFORTSHEIM	NUREMBERG	WARSTEIN*
	BARMEN-RITTERSHAUSEN		WIBORG*

* Blue Water Gas with Incandescent Burners.

ALSO TWENTY-FIVE INSTALLATIONS FOR MANUFACTURING PURPOSES.

THE DELLWIK-FLEISCHER WATER-GAS SYNDICATE,

25, VICTORIA STREET, WESTMINSTER, LONDON, S.W.

JOHN BROWN & CO., LTD., SHEFFIELD,

Proprietors of

ALDWARKE MAIN, CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 Feet of 19-Candle Gas per Ton.

Value in Pounds of Sperm, 820·80.

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We have **REVOLUTIONIZED** this Trade!!!

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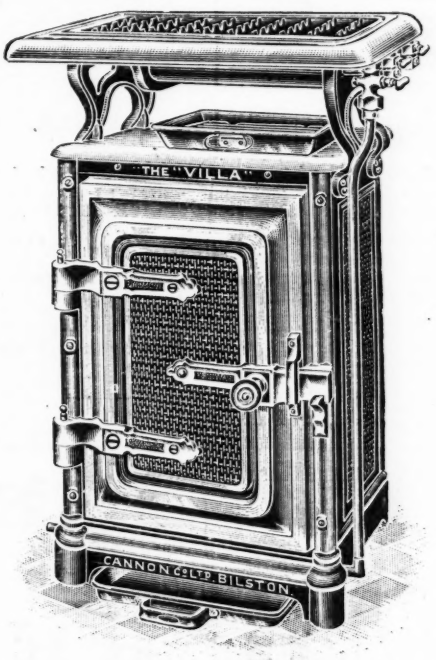

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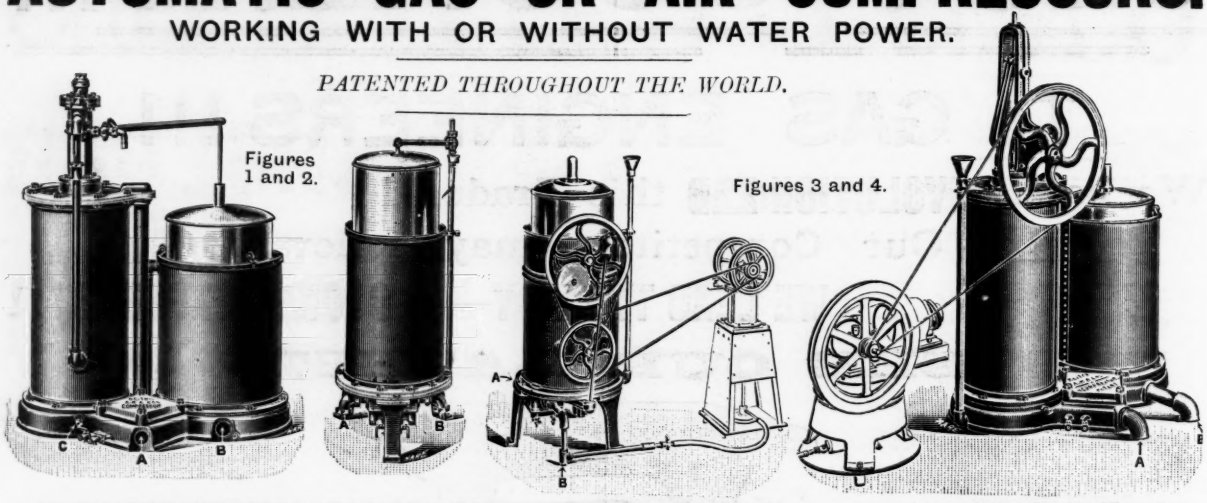

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This INVENTION, as Illustrated: Is, as shown by Figs. 1 and 2, worked by the ordinary service; uses an infinitesimal amount of water; requires no attention nor Lubrication; and, as shown by Figs. 3 and 4, may also be worked without water power and solely by the use of gas or oil, giving equally efficient results. In both cases, the Apparatus is absolutely automatic in action; is silent in operation; is devoid of friction in the compressing portion; gives a steady unvarying pressure of gas or air without pulsation on either the inlet or the outlet side; and is the most perfect of its kind in existence. **BEWARE OF UNSCRUPULOUS IMITATIONS.**

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our own Works, and the Settings also are of our own special design. Go to

SMETHWICK

and judge for yourselves as to the substantiality of the design, the excellence of the workmanship, the successful working and the beautifully even heats. No creeping of Coal in the Retorts, nor any abominable probing and tickling take place. Note the Measuring-Chambers and the Charging-Shoots, which

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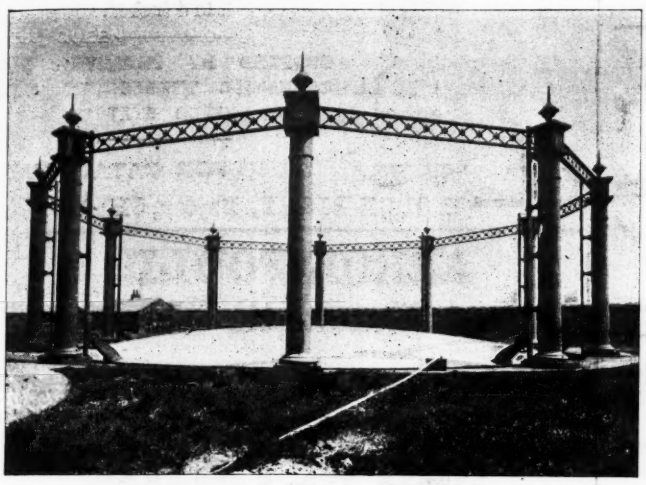


A GASHOLDER

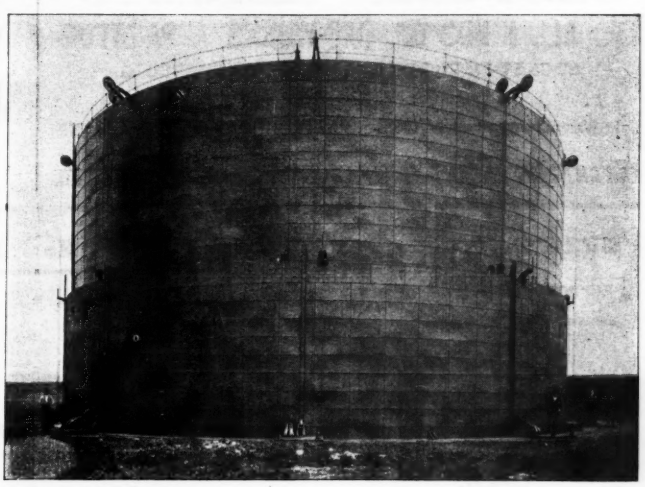
Guided by Ten massive Cast-Iron Columns and Girders is shown in the accompanying Photo.

AS IT WAS

originally erected by us

IN 1883.

We last year took down the Guide-Framing, converted the Holder into a Two-Lift; and this Photo. ☛ shows it



AS IT IS NOW

entirely guided by our Patent Steel Cable System.

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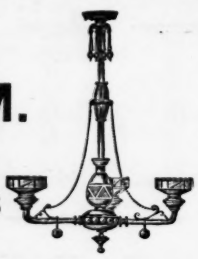

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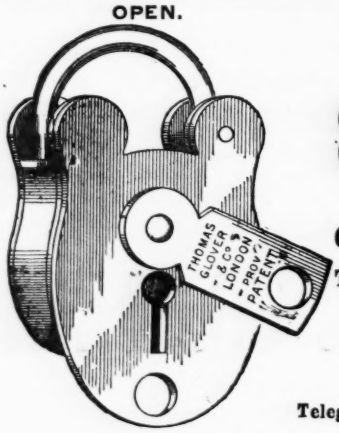

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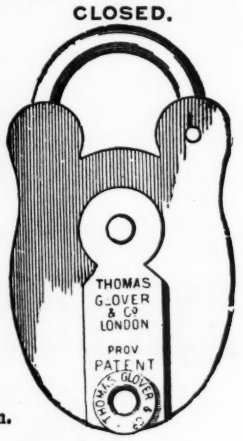

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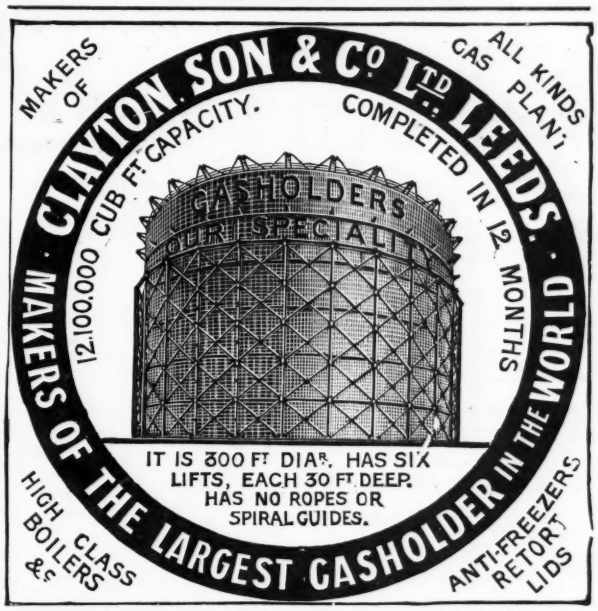
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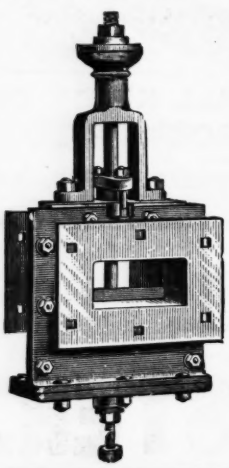

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